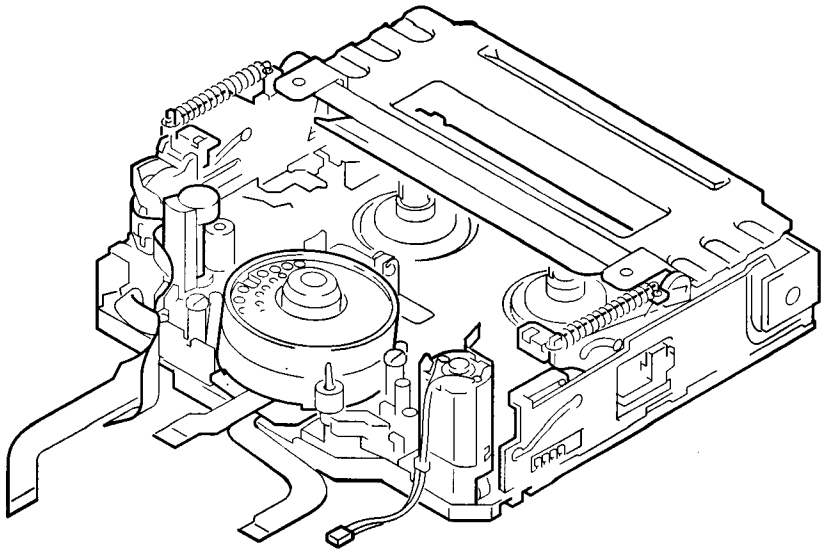
VIDE-V29151

8mm Video MECHANICAL ADJUSTMENT MANUAL IX

Ver 1.0 2000. 12

M2000 MECHANISM

Please use this manual with the service manual of the respective models.



Digital 8 MECHANISM DECK

SONY

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1. Preparations for Check, Adjustment and Replacement of Mechanism Block

Before Replacement, Check or Adjustment

- Refer to the "DISASSEMBLY" section of the SERVICE MANUAL of the respective models for details of removing cabinets and printed wiring boards.
- When checking a mechanism ir making any adjustment to the mechanism or replacing mechanical parts, be sure to use the Mode Selector II and select the appropriate status of the mechanical deck such that the mechanical status is suitable for the desired work. Refer to section "1-2. Mode Selector II Operating Procedure" for details on how to enter the mode shown in a rectangle ☐ mode in the sequent sections of this manual.

* Assemble and adjust the parts in the USE mode if any mode is not specified in this manual.

1-1. Service Jigs and Tools

Ref. No.	Name		Part code	Jig inscription	Used for
J-1	Cleaning fluid		Y-2031-001-0		
J-2	Wiping cloth		7-741-900-53		
J-3	Super-fine applicator (made by Nippon Applicator (P752D))				
J-4	Head eraser		commercially available		Tape path
J-5	Mirror (small oval type)		J-6080-840-A	GD-2038	Tape path
J-6	Alignment tape	NTSC : WR5-1NP	8-967-995-02		For tracking adjustment
		PAL : WR5-1CP	8-967-995-07		
J-7	FWD/RVS take-up torque cassette		J-6080-824-A	GD-2086	
J-8	Tape path screwdriver		J-6082-026-A		For tape guide adjustment
J-9	Adjustment remote commander (RM-95 upgrated)		J-6082-053-B		Tape path (for setting the path mode)(Note)
J-10	MD process table		J-6082-166-A		
J-11	Floil grease		7-662-001-39		
J-12	Torque screwdriver		J-9049-330-A		
J-13	Mode Selector II		J-6082-282-B		
J-14	Mode Selector II conversion board		J-6082-516-A		
J-15	Mode Selector II ROM, Ver 1.6		J-6082-314-E		
J-16	Thickness gauge		9-911-053-00		For capstan azimuth adjustment, LS cam plate position adjustment

Other required equipment:

- Oscilloscope
- Analog tester (20 kΩ)

Note: If the micro processor IC in the adjustment remote commander is not the new micro processor (UPD7503G-C56-12), the pages cannot be switched. In this case, replace with the new micro processor (8-759-148-35).

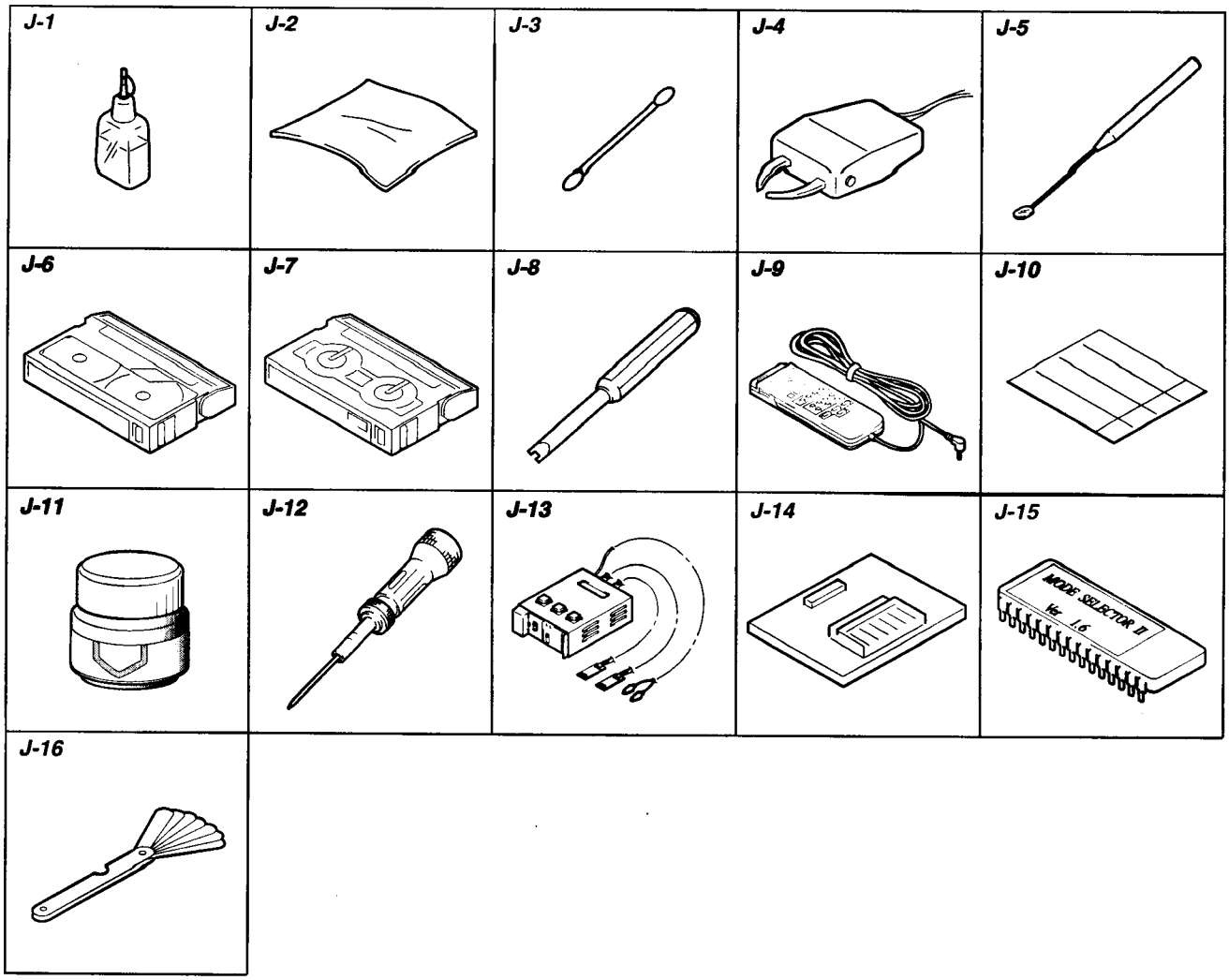


Fig. 1-1.

1-2. Mode Selector II Operating Procedure

1-2-1. Introduction

The Mode Selector II is a mechanism drive tool that assists maintenance work of the various mechanism decks. It has the following functions.

1. Manual Test

In this mode, the motor of the mechanism deck is powered only during the period while the switch is turned on manually. Using the Manual Test, the operator can freely control the motor of the mechanism deck.

2. Step Test

In this mode, the motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information. The Step Test is used to confirm a series of movements of the mechanism deck.

3. Auto Test

The Mode Selector II stores the status transition table in its memory as data indicating the respective modes of the mechanism deck. The status transition table can be used to confirm whether a mechanism deck is operating normally or has abnormality from a series of movements of a mechanism deck. If an abnormal status transition is detected during operation, the "NG" indication appears and the mechanism stops moving.

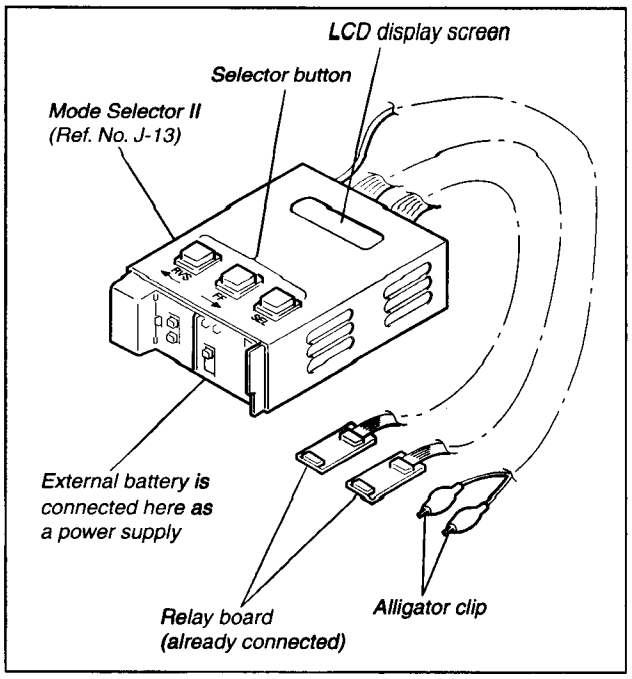


Fig. 1-2.

Mode Selector II (J-6082-282-B) connection diagram

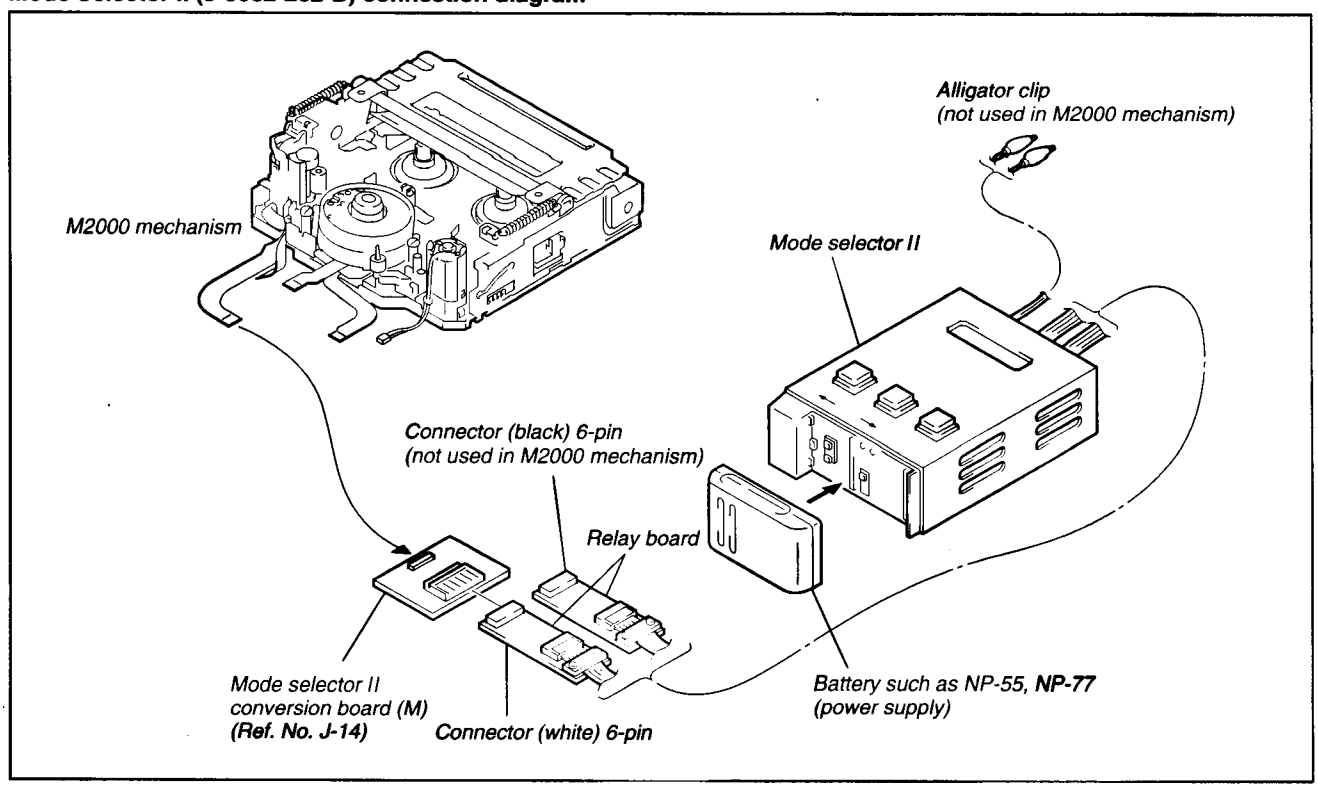
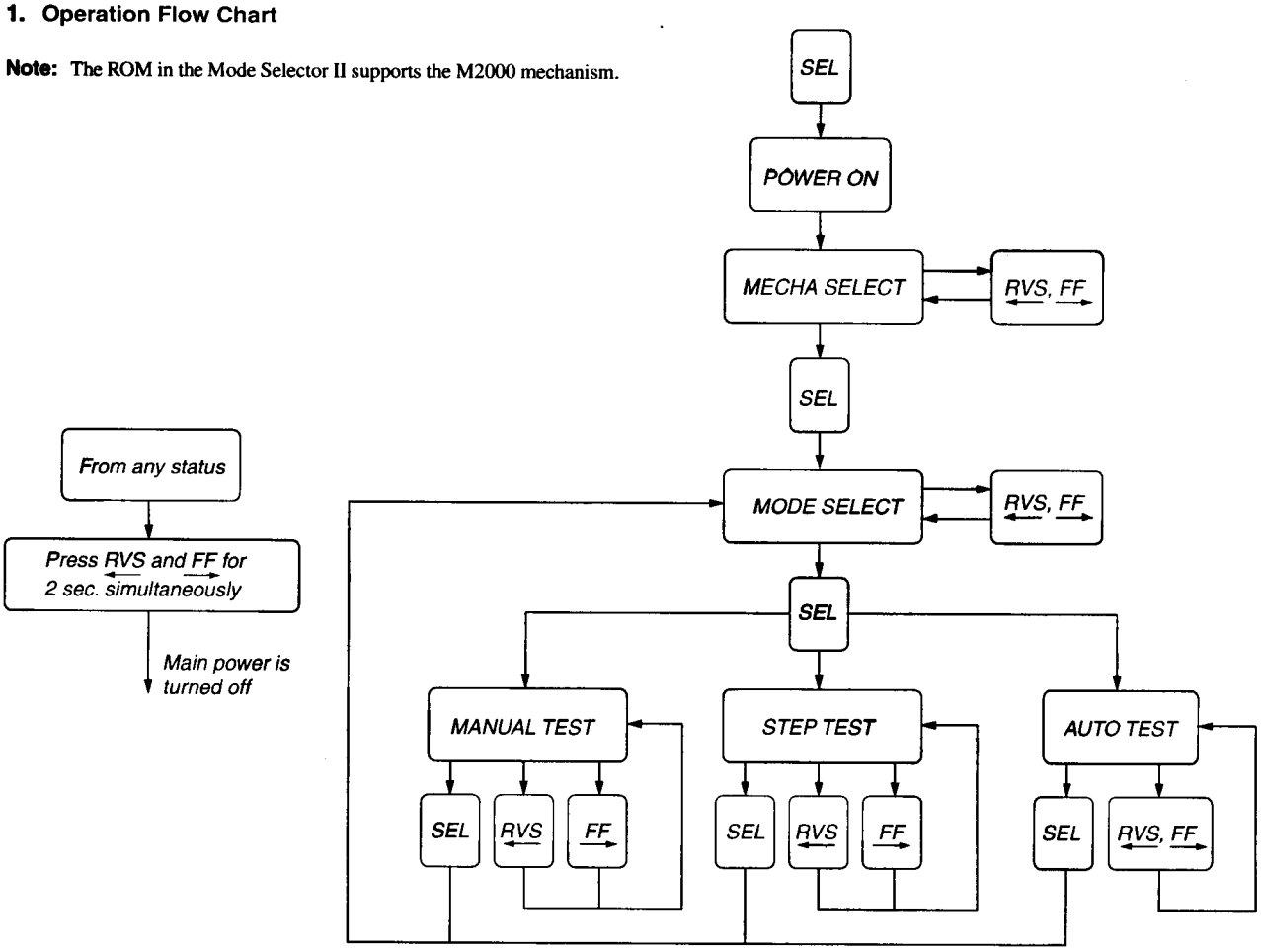


Fig. 1-3.

1-2-2. Operation

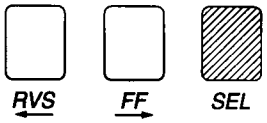
1. Operation Flow Chart

Note: The ROM in the Mode Selector II supports the M2000 mechanism.



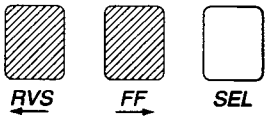
2. Mode Selector II Power On

Turn on the main power of the Mode Selector II as follows.
Press the SEL button.



3. Mode Selector II Power Off

Turn off the main power of the Mode Selector II as follows.
Press the RVS and FF buttons at the same time for 2 seconds or longer while the power is on.



4. Mecha Select

When the main power is turned on, the MECHA SELECT display appears on the LCD screen. Select the desired mechanism name using the RVS and FF buttons. Selection is complete when the SEL button is pressed. (Fig. A shows the B mechanism.)

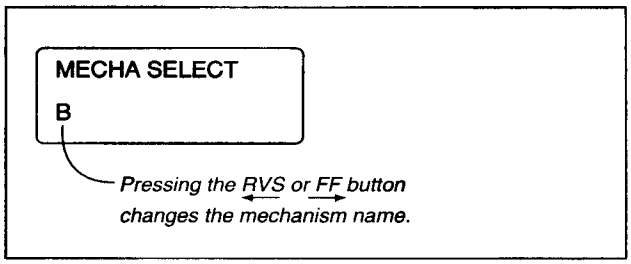


Fig. a

5. Test Type Select

Using the RVS and FF buttons, select a desired test type from the three types of "MANUAL", "STEP" and "AUTO". Selection is complete when the SEL button is pressed.

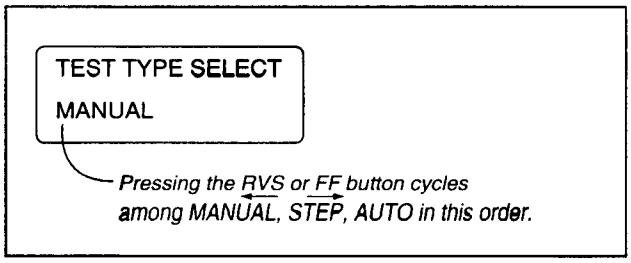


Fig. b

6. Manual Test

In this test, the motor of the mechanism deck is turned on only during the period while the RVS or FF button is pressed manually.

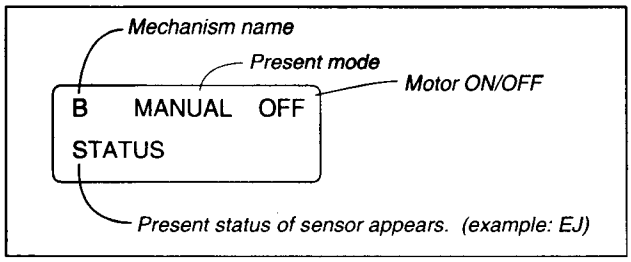


Fig. c

7. Step Test

In this test, the direction of motor movement is determined by the RVS and FF buttons. The motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information.

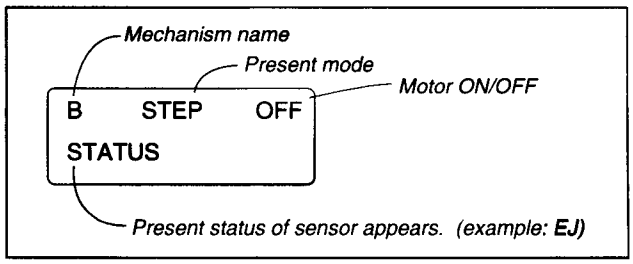


Fig. d

8. Auto Test

In this test, the mechanism deck is tested as to whether it performs a series of movements correctly in accordance with the operation sequence that is memorized earlier for each type of deck, by checking the output signals from sensors with the stored memory. Turning on the RVS or FF button performs the same operation.

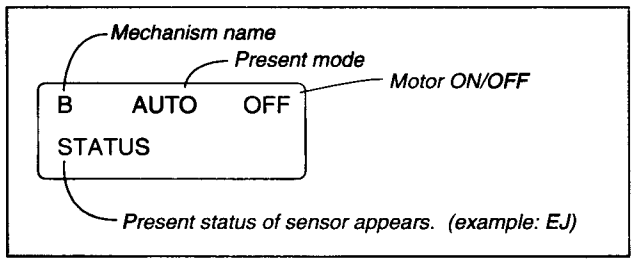


Fig. e

1-2-3. Mechanism Status (Position) Transition Table Using Mode Selector II

After selecting a mechanism deck, select either the MANUAL or STEP test (not AUTO) using the Mode Selector II. The desired mechanism status (position) can be specified by pressing the RVS or FF button. (The selected status appears on STATUS.)
EJ←→USE←→LOAD←→STOP←→TURN←→RP←→REW

Code (A B C) / MD name				M2000 Mechanism
A	B	C		
1	0	0	1	EJ
1	1	0	2	USE
0	1	0	3	LOAD
0	1	1	4	STOP
0	0	1	5	TURN
0	0	0	6	RP
1	0	1	7	REW

[0 is common and short.
1 is common and open.]

1-2-4. Battery Alarm Indication

When the level of the battery used to supply power to this system decreases, this display appears asynchronously. When this happens, all operations are disabled and the battery must be replaced.

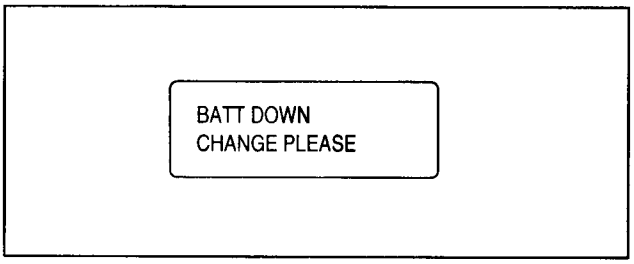


Fig. f

2. Periodic Inspection and Maintenance

- Be sure to perform the following maintenance and inspection so that the machine delivers its full performance and functions, and to protect the machine and tape. Also, perform the following maintenance items after completing the repair work, regardless of the number of hours the machine has been operated by the user.

2-1. Rotary Drum Cleaning

1) Press a wiping cloth (Ref. No. J-2) moistened with cleaning fluid (Ref. No. J-1) lightly against the rotary drum. Rotate the upper drum with a super-fine applicator slowly in the counter-clockwise direction to clean the rotary drum.

Caution: Never rotate the rotary drum by turning on the main power of the motor or rotate it in the clockwise direction. Never move the cloth vertically against the head tip, as this will surely damage the video head; the video head must not be cleaned by any other different methods.

2-2. Tape Path System Cleaning
(Refer to Fig. 2-1.)

1) Set the EJECT state. Clean the tape running path (TG1, 2, 3, 4, 5, 6 and 7, pinch roller and capstan shaft) and lower drum with a super-fine applicator (Ref. No. J-3) moistened with cleaning fluid.

Note 1: Be careful not to allow oil or grease of the various link mechanisms to get on the super-fine applicator (Ref. No. J-3).
Note 2: Once the super-fine applicator has been moistened with alcohol, do not use it to clean other mechanical parts such as the tape guide. However, the pinch roller is cleaned with alcohol.
Note 3: When cleaning the capstan shaft, be carefull not to move the oil seal. If the oil seal is moved, oil will leak.

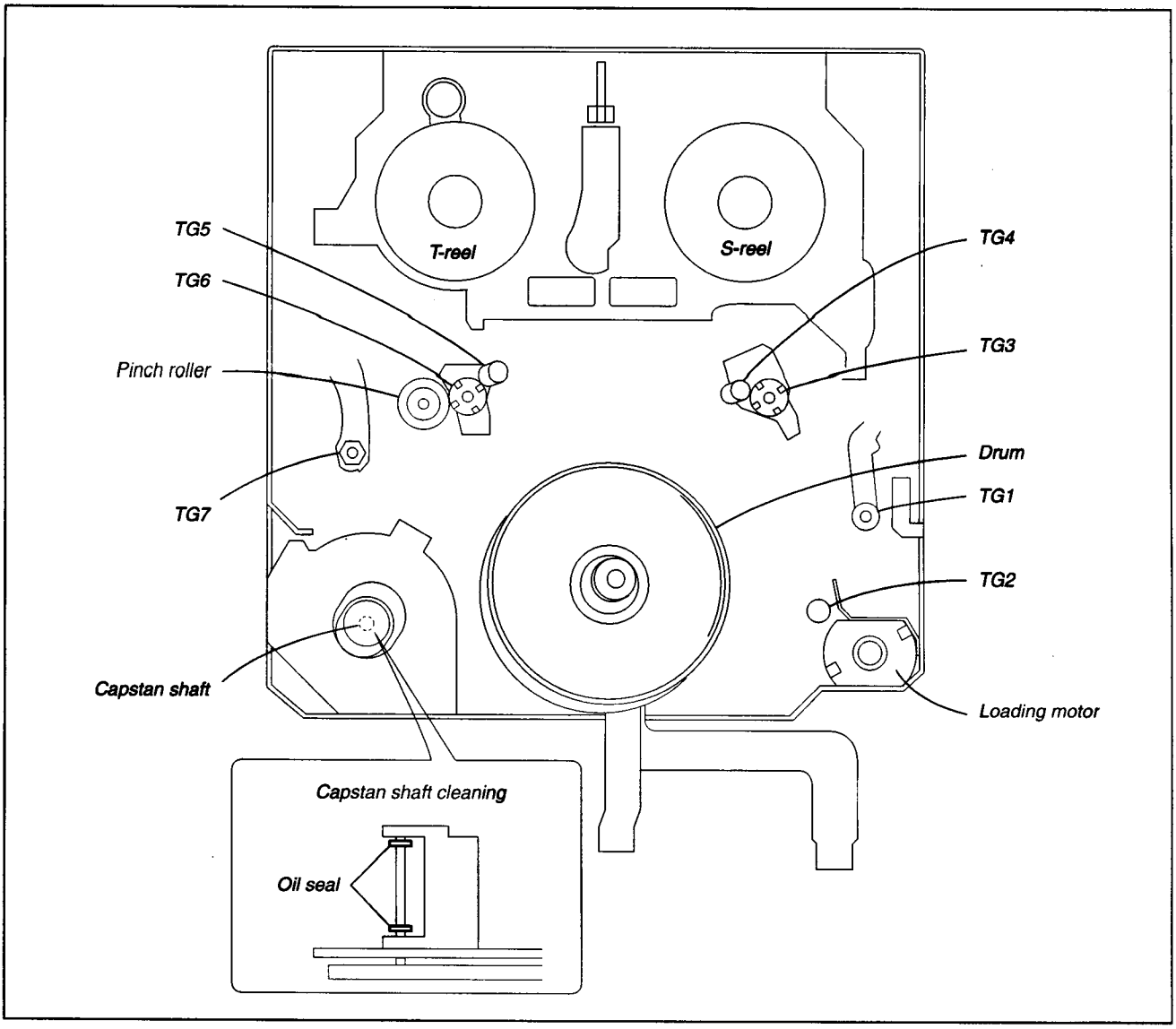


Fig. 2-1

2-3. Periodic Inspection List

Maintenance and inspection item		Operating hours (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Tape running surface cleaning	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
	Rotary drum cleaning and degaussing	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
Drive mechanism	Timing belt	—	☆	—	☆	—	☆	—	☆	—	☆	
Drive mechanism	Capstan shaft	—	☆	—	☆	—	☆	—	☆	—	☆	Never attach oil to the tape running path during periodic inspection.
Drive mechanism	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
Performance check	Back-tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	FWD/RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

Note: When the machine is overhauled, replace the parts referring to the above list.

○: Cleaning, ☆: Check

2-4. Appling Oil and Grease

When replacing or assembling the parts, use oil and grease while referring to the following.

On Oil

- Be sure to use the specified grease only. (If oil of different viscosity is used, it can cause various troubles.)
  Oil: Part No. 7-661-018-18
  (Mitsubishi diamond oil hydro fluid NT-68)
- The oil used for bearings must not contain any dust or other materials, otherwise excessive abrasion and seizure of the bearing could occur.
- A drop of oil means the amount of oil as shown in the illustration in the right, which is the amount that is attracted to the top of a rod of 2 mm diameter.

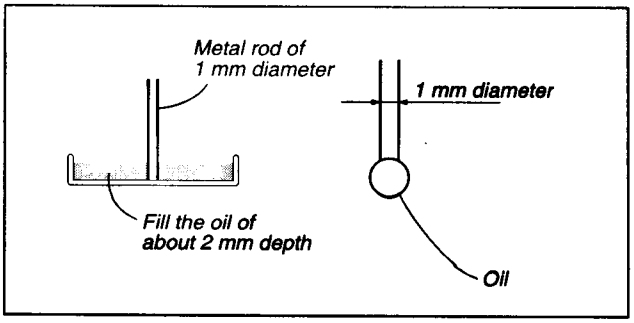


Fig. 2-2

On Grease

- Be sure to use the specified grease only. (If oil of different viscosity is used, it can cause various troubles.)
  Floil grease: Part No. 7-662-001-39
- Be sure to use grease into which dust is not mixed.
- The amount of grease is 1 to 1.5 mm diameter in length.

3. Before Replacement, Check or Adjustment

3-1. Phase Adjustment

The phase adjustment of this mechanism block has been adjusted by using the in-phase markings shown in the following figure. When replacing or assembling the parts, check the phase.

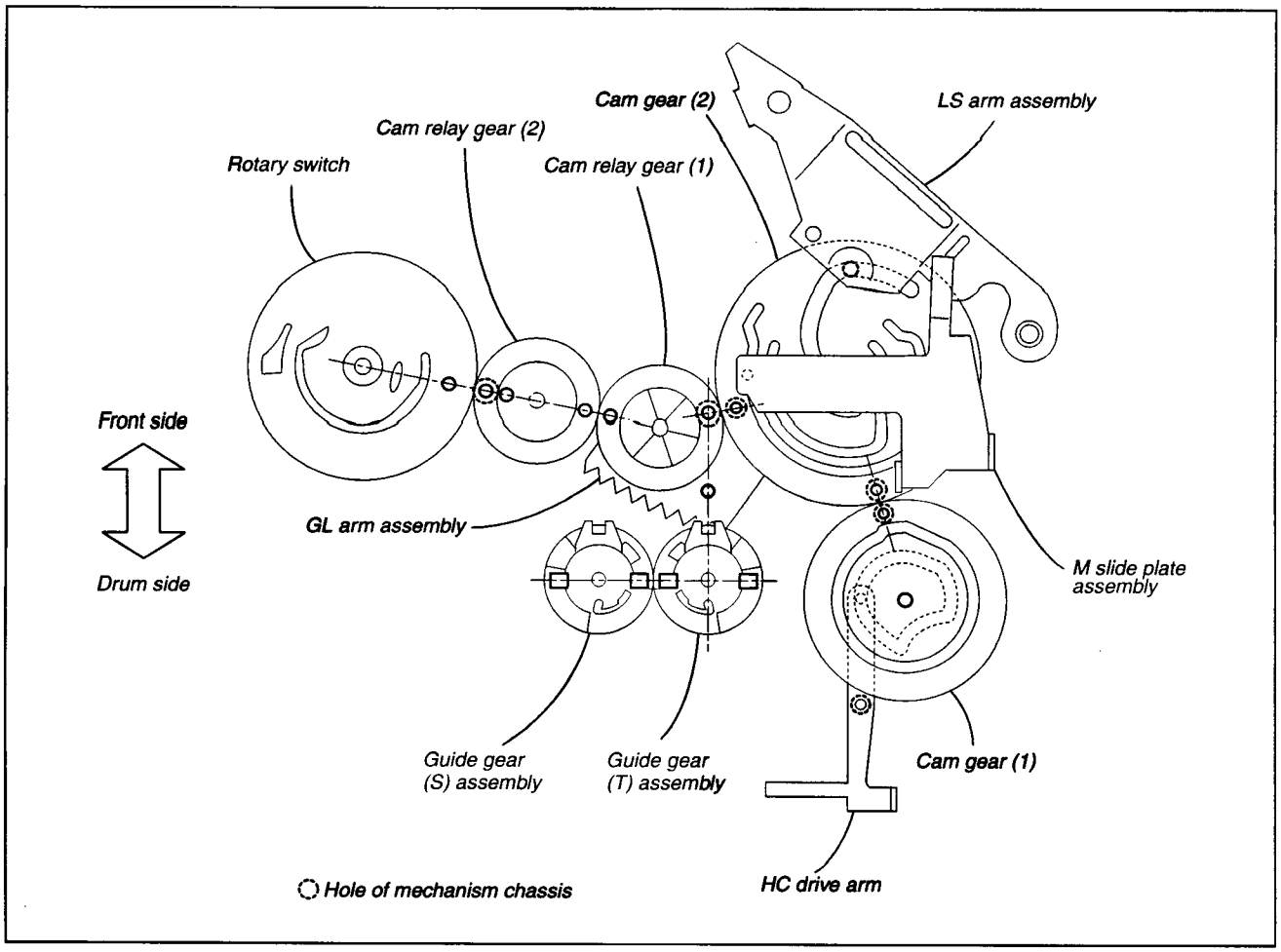


Fig. 3-1.

3-2. Cassette compartment assembly

1. Removal procedure

1) Set the [EJ] mode to move up the cassette compartment assembly ⑩.
2) Remove the capstan flexible board and flexible wiring board (FP-300) ① from the holders Ⓧ, Ⓨ and Ⓩ in the directions of the arrows Ⓐ, Ⓑ and Ⓒ.
3) Push the damper assembly ③ in the directions of the arrows Ⓓ and Ⓔ and remove it from the notch of the LS chassis block assembly.
4) Remove the two screws (camera pan2 main M1.4 × 1.6) ④.
5) With the cassette compartment assembly ⑩ half opened, move the face plate in the direction of the arrow Ⓕ and remove it from the grooves ⑥ and ⑦ on the LS chassis block assembly.
6) Remove the cassette holder (S) ⑧ and cassette holder (T) ⑨ of the cassette compartment assembly ⑩ from the groove on the LS chassis block assembly.

2. Attachment procedure

1) Set the [USE] mode.
2) Insert the cassette holder (S) ⑧ of the cassette compartment assembly ⑩ and cassette holder (T) ⑨ into the grooves on both sides of the LS chassis block assembly.
3) While moving down the cassette compartment assembly ⑩, lift up the face plate in the direction of the arrow Ⓕ and keep this status. Then, insert the face plate in the grooves ⑥ and ⑦ on the LS chassis block assembly.
4) Tighten the two screws (camera pan2 main M1.4×1.6) ④.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
5) Move the damper arm of the damper assembly ③ to the 4 o'clock position and insert the damper assembly into the hole on the LS chassis block assembly and the dowel of the cassette holder (T) ⑨.
6) Align the damper assembly ③ with the notch of the LS chassis block assembly and rotate the damper assembly ③ in the opposite direction to the arrow Ⓔ to fix it.

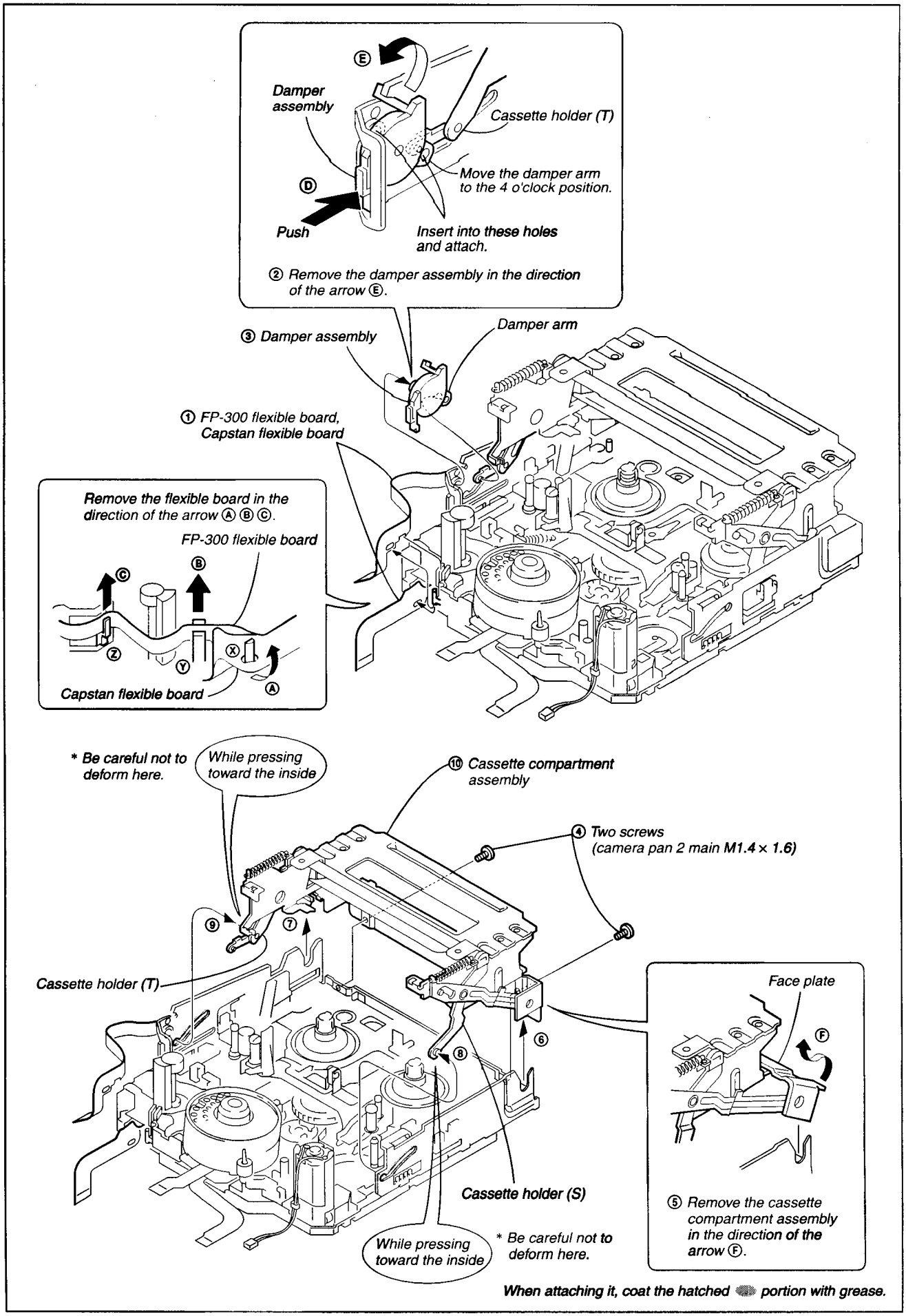

Damper assembly
Cassette holder (T)
Move the damper arm to the 4 o'clock position.
Push
Insert into these holes and attach.
② Remove the damper assembly in the direction of the arrow Ⓔ.
③ Damper assembly
Damper arm
① FP-300 flexible board, Capstan flexible board
Remove the flexible board in the direction of the arrow Ⓐ Ⓑ Ⓒ.
FP-300 flexible board
Capstan flexible board
* Be careful not to deform here.
While pressing toward the inside
⑩ Cassette compartment assembly
④ Two screws (camera pan 2 main M1.4 × 1.6)
Cassette holder (T)
Face plate
⑤ Remove the cassette compartment assembly in the direction of the arrow Ⓕ.
Cassette holder (S)
While pressing toward the inside
* Be careful not to deform here.
When attaching it, coat the hatched portion with grease.

Fig. 3-2.

4. Check, Adjustment and Replacement

Note: For removal procedure of the cabinets, printed wiring boards and other parts, refer to "DISASSEMBLY" of the Service Manual of the respective models.

4-1. Drum Assembly

1. Removal procedure

1) Remove the three screws (drum fitting M1.4 x 2.5) ① fixing the drum and remove the drum.

2. Attachment procedure

1) Align the two reference holes A and B on the rear of the drum with the reference pins A and B of the drum base assembly.
2) Attach the drum with the three screws (drum fitting M1.4 × 2.5) ① in the order of Ⓐ, Ⓑ and Ⓒ.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
3) Clean the drum while referring to 2-1.
4) Adjust the tape path. (Refer to "4. Tape Path Adjustment".)

Note: Do not touch the outside circumference.

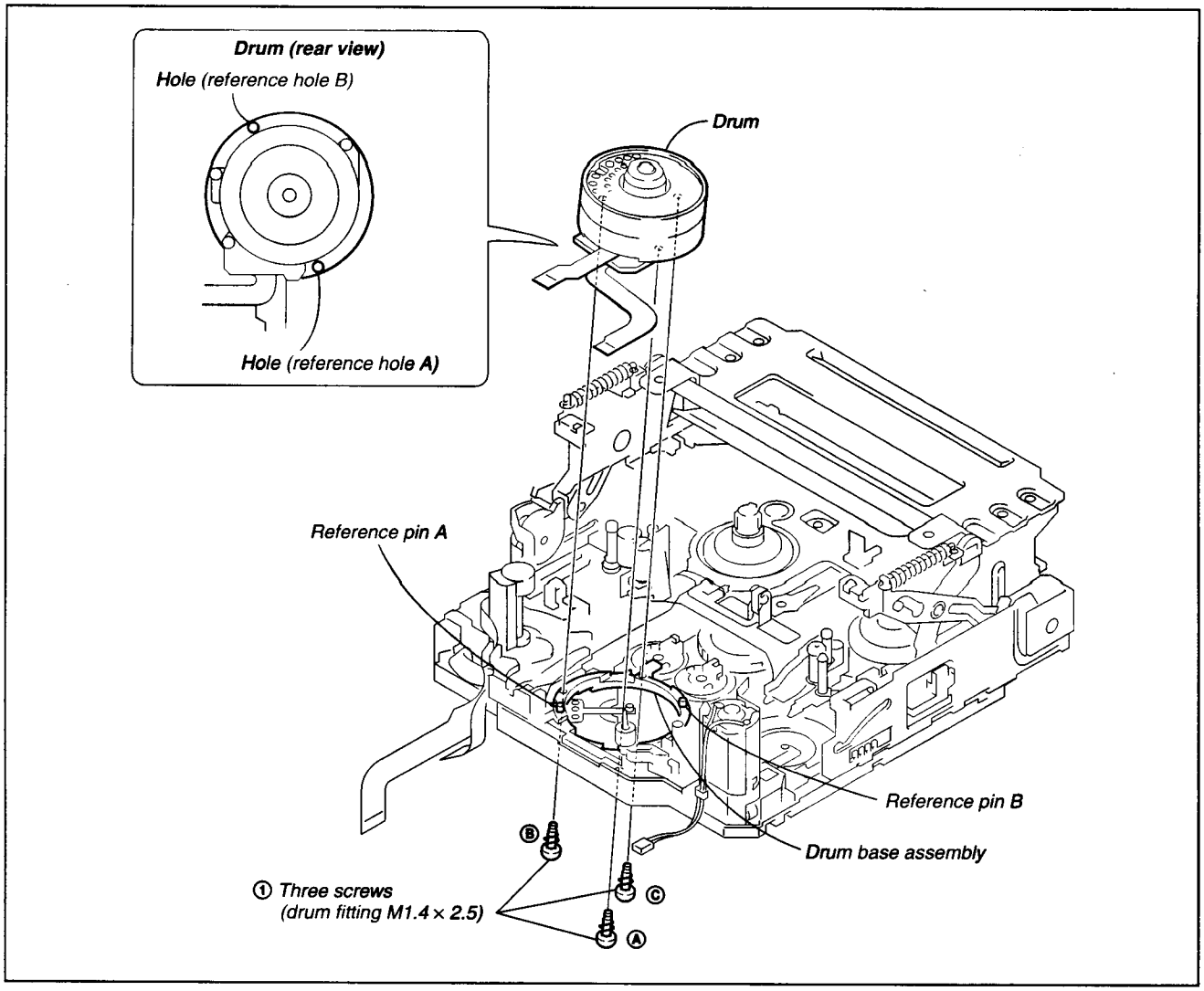


Fig. 4-1.

4-2. HCL Arm Assembly, Loading Motor Assembly

1. Removal procedure

1) Hook the HC arm spring in the direction of the arrow Ⓑ.
2) Remove the HCL arm assembly ② from the loading motor assembly ④.
3) Remove the screw (M1.4 × 2.5) ③.
4) Remove the three claws of the loading motor assembly ④ from the mechanism chassis assembly in the direction of the arrow Ⓐ.

2. Attachment procedure

1) Coat the worm shaft and gear of the loading motor assembly ④ with grease.
2) Insert the three claws of the loading motor assembly ④ into the groove on the mechanism chassis assembly.
3) Attach the screw (M1.4 × 2.5) ③.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
4) Check the position of the HCL arm assembly ② and the HC drive arm. Then attach the HCL arm assembly ② to the loading motor assembly ④.
5) Hook the HC arm spring ① on the notch of the loading motor assembly ④.
6) Clean the drum assembly. (Refer to section 2-1.)

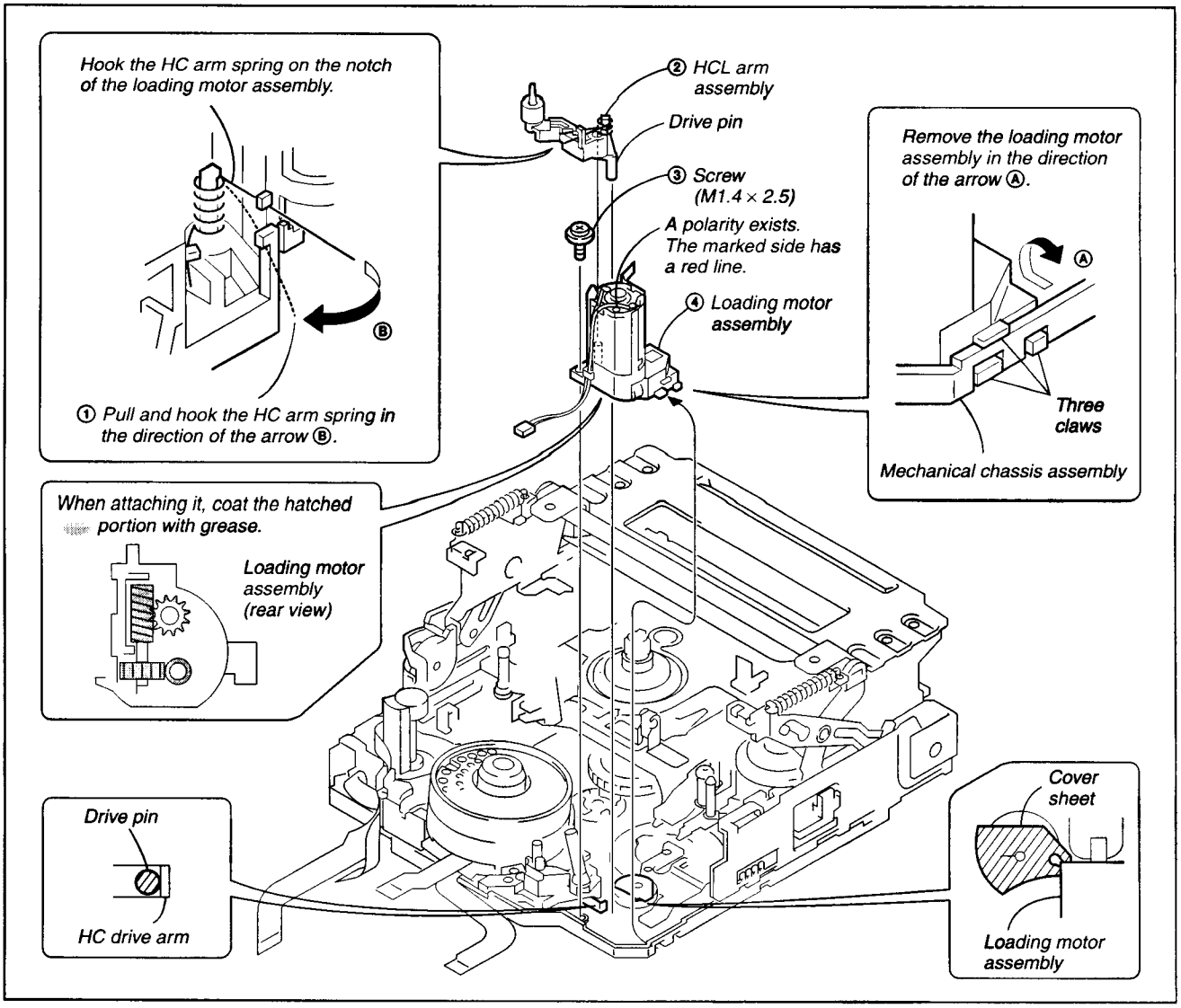

Hook the HC arm spring on the notch of the loading motor assembly.
① Pull and hook the HC arm spring in the direction of the arrow Ⓑ.
② HCL arm assembly
Drive pin
③ Screw (M1.4 × 2.5)
A polarity exists. The marked side has a red line.
④ Loading motor assembly
Remove the loading motor assembly in the direction of the arrow Ⓐ.
Three claws
Mechanical chassis assembly
When attaching it, coat the hatched portion with grease.
Loading motor assembly (rear view)
Drive pin
HC drive arm
Cover sheet
Loading motor assembly

Fig. 4-2.

4-3. Drum Base Assembly, Drum Earth

1. Removal procedure

1) Remove the capstan flexible board and flexible wiring board (FP-300) from the holders Ⓧ, Ⓨ and Ⓩ in the direction of the arrow.
2) Remove the drum assembly. (Refer to section 4-1.)
3) Remove the screw (M1.4 × 2.5) ②.
4) Remove the claw Ⓓ of the guide rail T2 ③ from the hole Ⓔ of the drum base assembly in the direction of the arrow Ⓕ.
5) Remove the three screws (M1.4 × 2.5) ④.
6) Remove the drum base assembly ⑤ in the direction of the arrow.
7) Remove the screw (screw assy PW M1.7 × 2.6) ⑥.
8) Remove the drum earth ⑦ and earth spacer ⑧.

2. Attachment procedure

1) Attach the ground spacer ⑧ and drum ground ⑦ with the screw (screw assy PW M1.7 × 2.6) ⑥.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
2) Align the drum base assembly ⑤ with the reference pin and tighten the three screws (M1.4 × 2.5) ④ in the order of Ⓖ, Ⓗ and Ⓘ.
3) Insert the claw Ⓓ of the guide rail T2③ into the hole Ⓔ of the drum base assembly ⑤ and tighten the screw (M1.4 × 2.5) ②.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 kgf•cm)
4) Remove the drum assembly. (Refer to 4-1.)
5) Attach the flexible wiring board (FP-300) ① and capstan flexible board to the drum base assembly.
6) Clean the tape running path. (Refer to 2-2.)

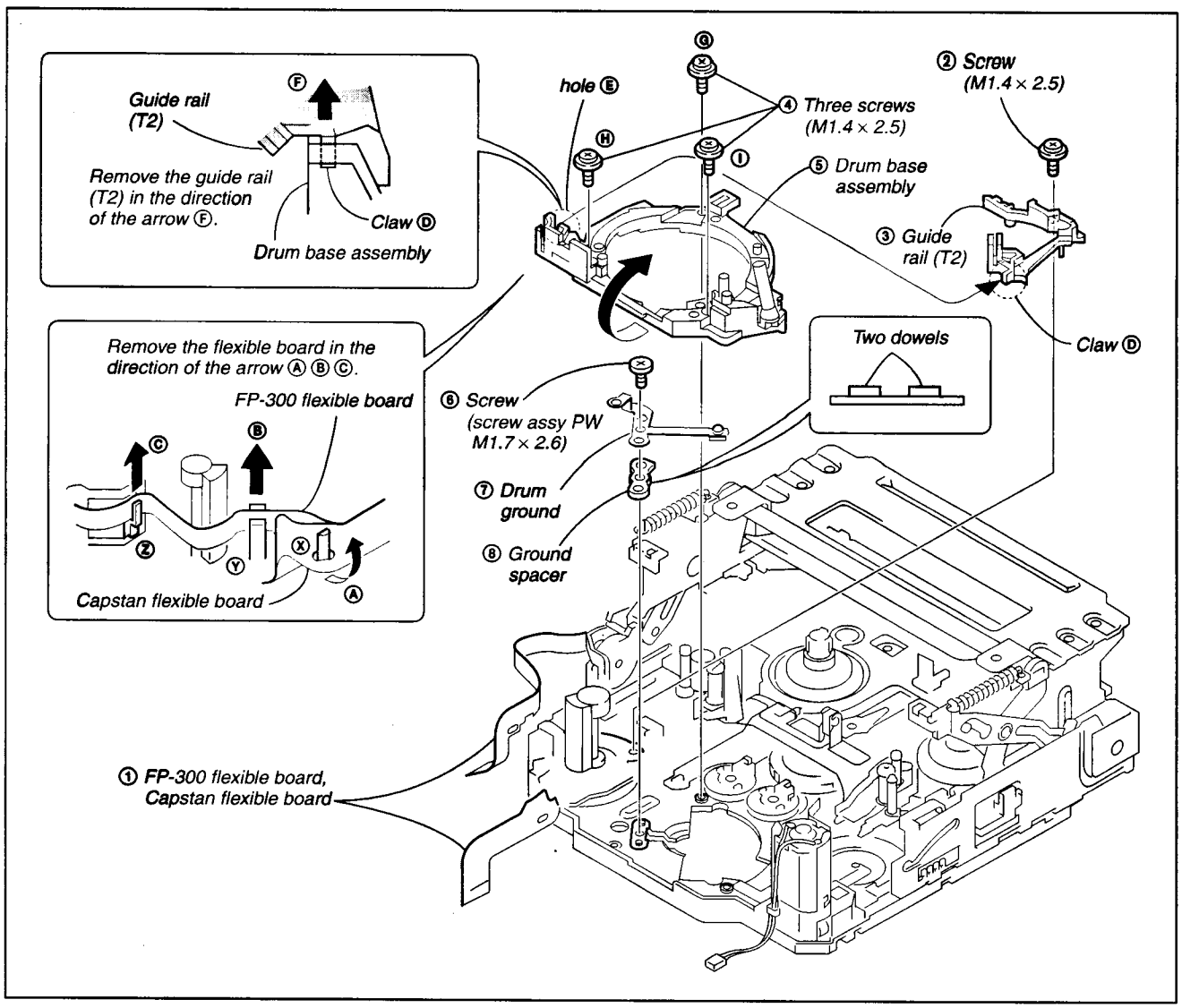

Guide rail (T2)
Remove the guide rail (T2) in the direction of the arrow Ⓕ.
Claw Ⓓ
Drum base assembly
hole Ⓔ
② Screw (M1.4 × 2.5)
④ Three screws (M1.4 × 2.5)
⑤ Drum base assembly
③ Guide rail (T2)
Claw Ⓓ
Two dowels
Remove the flexible board in the direction of the arrow Ⓐ Ⓑ Ⓒ.
FP-300 flexible board
Capstan flexible board
⑥ Screw (screw assy PW M1.7 × 2.6)
⑦ Drum ground
⑧ Ground spacer
① FP-300 flexible board, Capstan flexible board

Fig. 4-3.

4-4. Guide Rail T2, Capstan Motor

1. Removal procedure

1) Remove the capstan flexible board and flexible wiring board (FP-300) ① from the holders Ⓧ, Ⓨ and Ⓩ in the directions of the arrows Ⓐ, Ⓑ and Ⓒ.
2) Remove the screw (M1.4 × 2.5) ②.
3) Remove the claw of the guide rail T2 ③ from the hole on the drum base assembly in the direction of the arrow Ⓓ.
4) Remove the six solderings ④.
5) Remove the FP-228 flexible wiring board (2P) (DEW sensor) ⑤.
6) Remove the two screws (camera pan2 main M1.4 × 1.6) ⑥ and the screw (SANG camera pan2 main M1.4 × 4.5) ⑦.
7) Remove the capstan motor ⑧.
8) Remove the capstan spring ⑨ (be careful not to drop the capstan spring) and timing belt ⑩.

2. Attachment procedure

1) Hook the timing belt ⑩ on the gear of the capstan motor ⑧, attach the capstan motor while aligning it with the reference boss of the mechanism chassis assembly.
2) Attach the screw (SANG camera pan2 M1.4 × 4.5) ⑦ and capstan spring ⑨, (temporally attachment)
3) Attach the two screws (camera pan2 M1.4 × 1.6) ⑥.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
4) Attach the six solderings ④ to the FP-228 flexible wiring board ⑤ (2P) (DEW sensor) and the FP-299 flexible wiring board (4P).
5) Insert the guide rail T2 ③ into the hole on the drum base assembly and tighten the screw (M1.4 × 2.5) ②.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
6) Attach the capstan flexible board and the flexible wiring board (FP-300) ① to the holders Ⓧ, Ⓨ and Ⓩ.
7) Adjust the height of the capstan motor using the thickness gauge (Ref. No. J-16). (Refer to 5-3.)

Note: Be careful not to touch the center of the capstan motor ⑩ shaft and the FP-228 flexible wiring board (DEW sensor) with soldering iron or other tool.

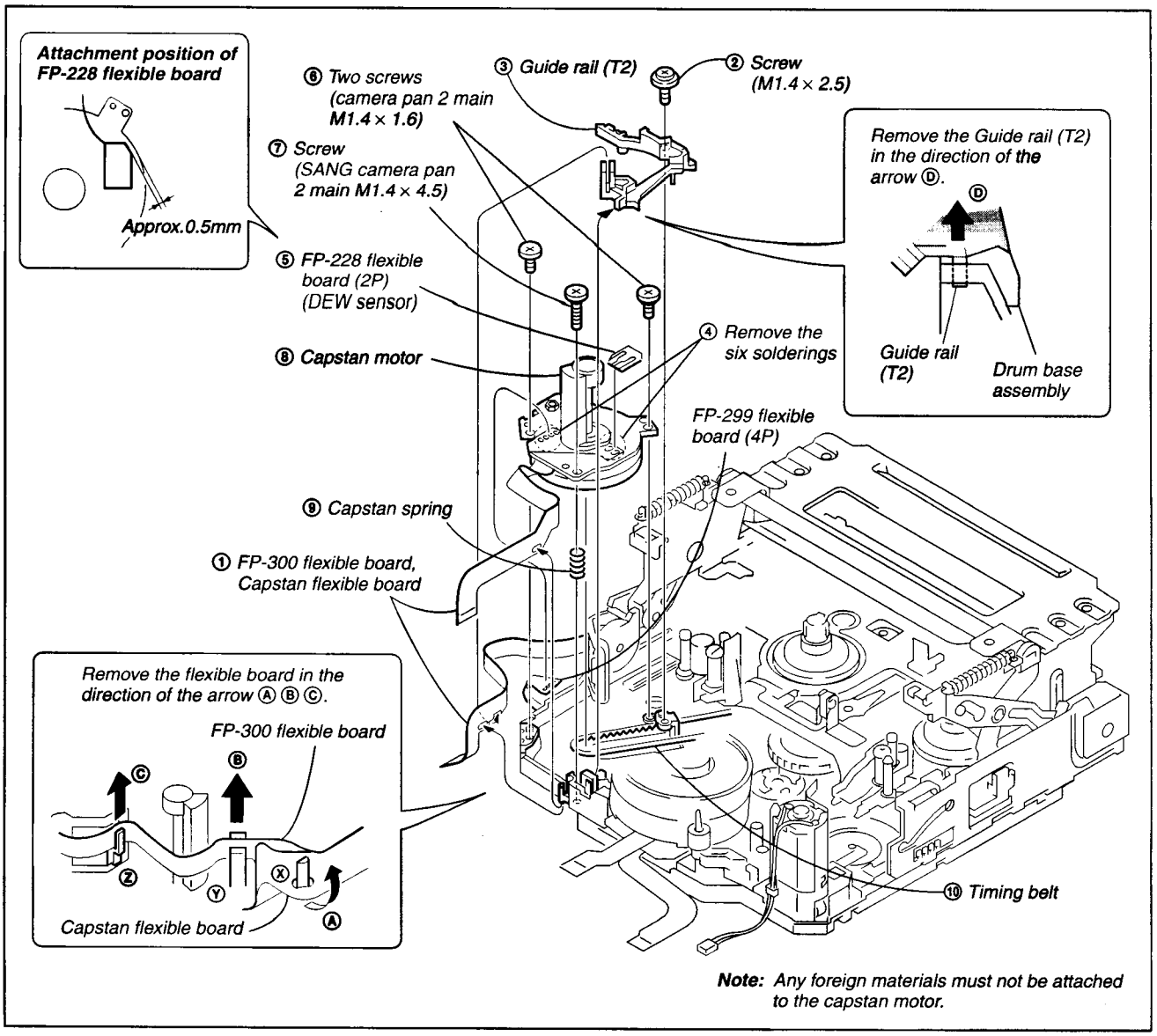

Attachment position of FP-228 flexible board
Approx.0.5mm
⑥ Two screws (camera pan 2 main M1.4 × 1.6)
③ Guide rail (T2)
② Screw (M1.4 × 2.5)
⑦ Screw (SANG camera pan 2 main M1.4 × 4.5)
Remove the Guide rail (T2) in the direction of the arrow Ⓓ.
Ⓓ
Guide rail (T2)
Drum base assembly
⑤ FP-228 flexible board (2P) (DEW sensor)
④ Remove the six solderings
⑧ Capstan motor
FP-299 flexible board (4P)
⑨ Capstan spring
① FP-300 flexible board, Capstan flexible board
Remove the flexible board in the direction of the arrow Ⓐ Ⓑ Ⓒ.
FP-300 flexible board
Ⓒ
Ⓑ
Ⓩ
Ⓨ
Ⓧ
Ⓐ
Capstan flexible board
⑩ Timing belt
Note: Any foreign materials must not be attached to the capstan motor.

Fig. 4-4.

4-5. Blind Plate, Lock Guide

1. Removal procedure

1) Remove the diode D001 (tape LED) ① from the notch of the plate ④.
2) Remove the flexible wiring board ② (FP-301) from T-shaped portion of the blind plate ④ in the direction of the arrow Ⓐ.
3) Remove the screw (camera pan2 main M1.4 × 1.6) ③.
4) Release the hook on the notches Ⓖ, Ⓓ, Ⓔ and Ⓕ of the blind plate ④ in the direction of the arrow Ⓑ.
5) Remove the reel release lever ⑤ in the direction of the arrow Ⓒ.

2. Attachment procedure

1) Attach the reel release lever ⑤ to the blind plate ④.
2) Hang the notches Ⓖ, Ⓓ, Ⓔ and Ⓕ of the blind plate ④ on the hook.
3) Attach the screw (camera pan2 main M1.4 × 1.6) ③.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
4) Attach the flexible wiring board (FP-301) ② to the T-shaped portion of the blind plate ④.
5) Attach the diode (tape LED) ① to the notch of the blind plate ④.

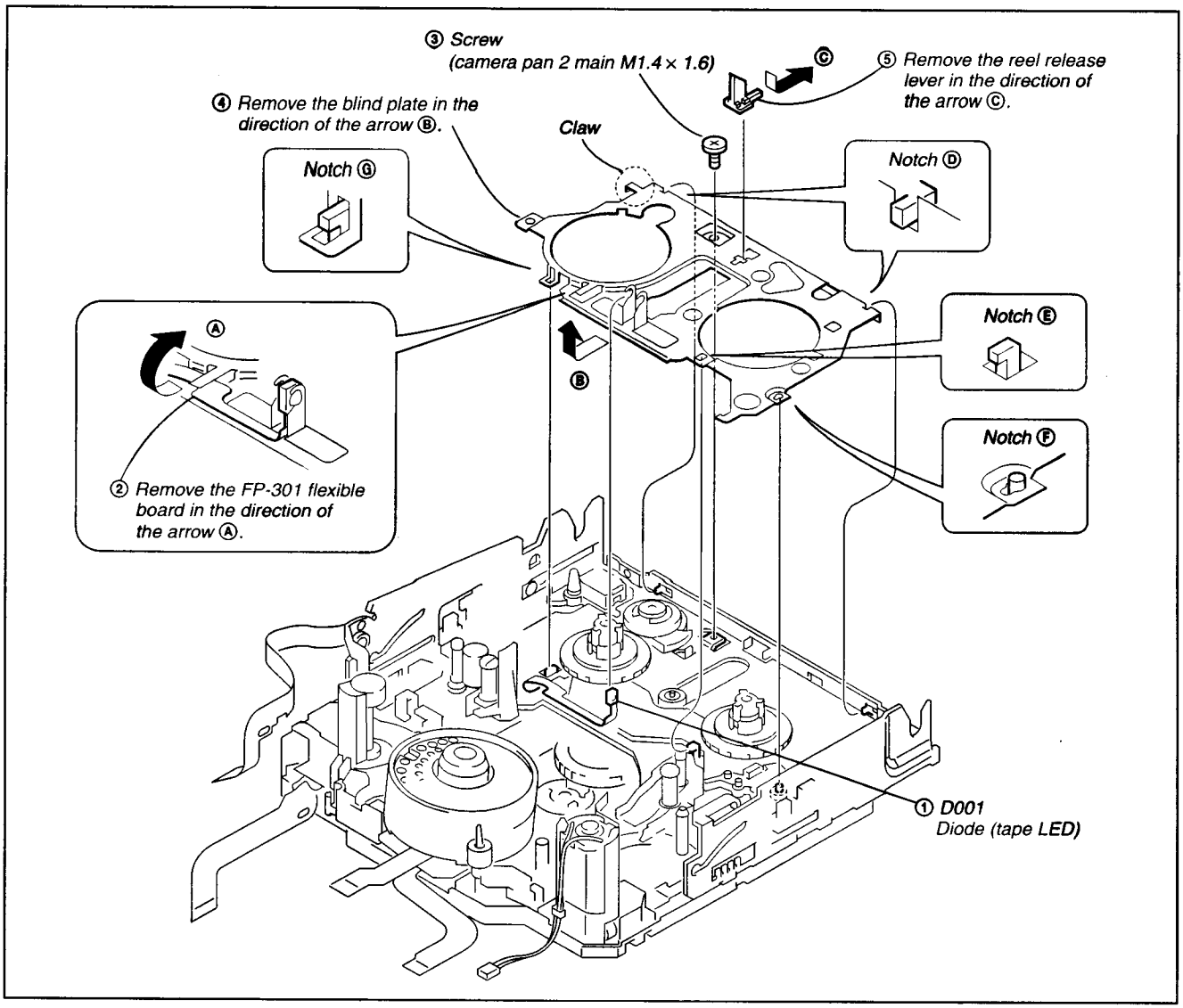

③ Screw
(camera pan 2 main M1.4 × 1.6)
⑤ Remove the reel release lever in the direction of the arrow Ⓒ.
④ Remove the blind plate in the direction of the arrow Ⓑ.
Claw
Notch Ⓖ
Notch Ⓓ
Notch Ⓔ
Notch Ⓕ
Ⓐ
Ⓑ
② Remove the FP-301 flexible board in the direction of the arrow Ⓐ.
① D001
Diode (tape LED)

Fig. 4-5.

4-6. Reel Table (T) Assembly, T Soft Assembly

1. Removal procedure

1) Remove the blind plate. (Refer to 4-5.)
2) Open the claw of the reel table T assembly ① in the directions of the arrows Ⓑ and Ⓒ and remove the reel table T assembly.
3) Remove the T soft assembly ② in the direction of the arrow Ⓐ.
4) Remove the T ratchet spring ③.
5) Remove the T ratchet arm ④ in the direction of the arrow Ⓓ.

2. Attachment procedure

1) Insert the T ratchet arm ④ into the groove on the LS chassis block assembly to attach it.
2) Attach the T ratchet spring ③ to the notch of the T ratchet arm ④ and LS chassis block assembly.
3) Insert the T soft assembly into the groove on the LS chassis block assembly.
4) Check the location of the reel table T assembly and attach the LS chassis block assembly to the shaft.
5) Attach the blind plate. (Refer to 4-5.)

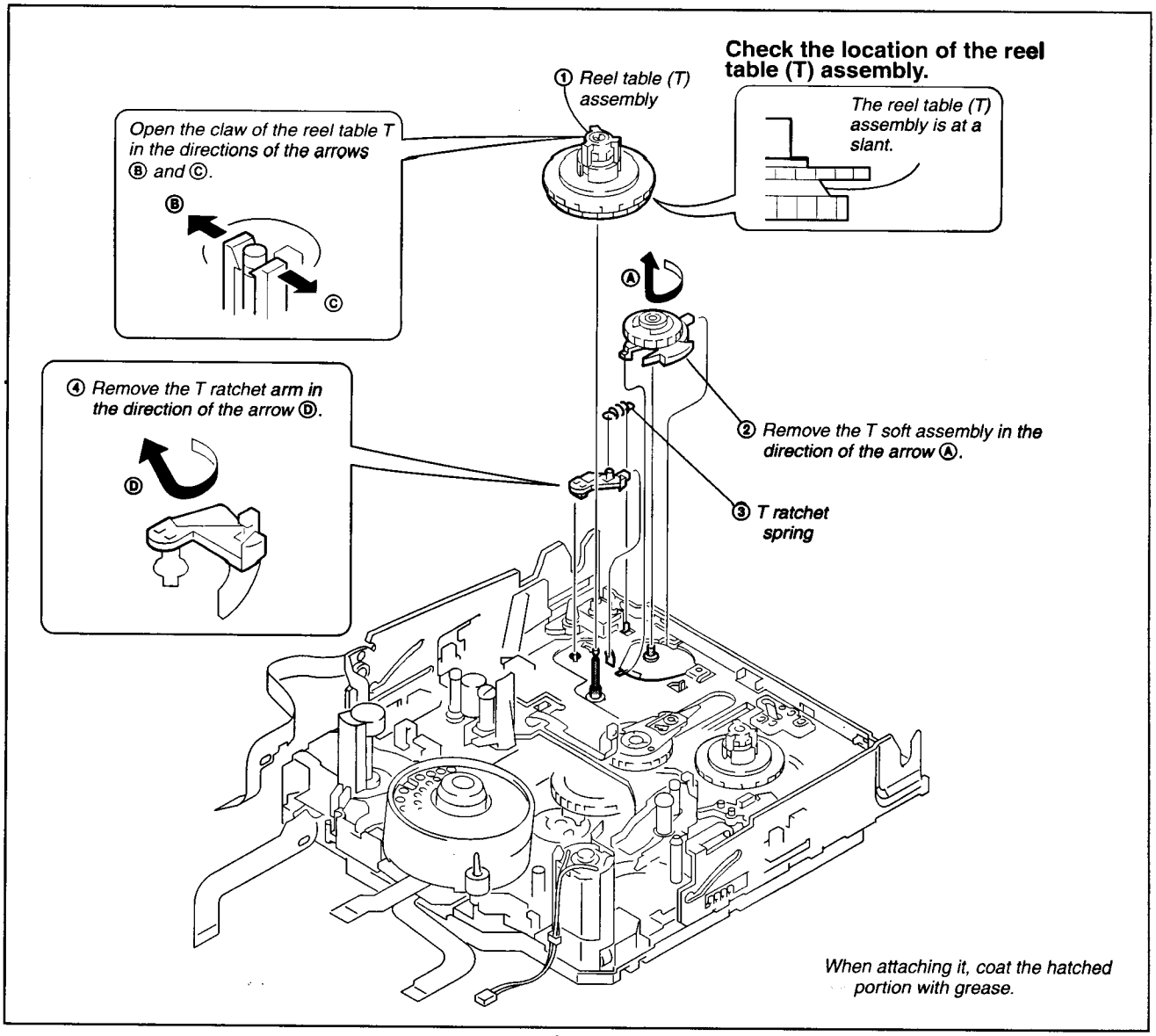

Check the location of the reel table (T) assembly.
① Reel table (T) assembly
The reel table (T) assembly is at a slant.
Open the claw of the reel table T in the directions of the arrows Ⓑ and Ⓒ.
Ⓑ
Ⓒ
Ⓐ
④ Remove the T ratchet arm in the direction of the arrow Ⓓ.
Ⓓ
② Remove the T soft assembly in the direction of the arrow Ⓐ.
③ T ratchet spring
When attaching it, coat the hatched portion with grease.

Fig. 4-6.

4-7. S Ratchet RE Plate, Cassette Guide S

1. Removal procedure

1) Remove the blind plate. (Refer to 4-5.)
2) Remove the RE return plate spring ①.
3) Remove the S ratchet spring ②.
4) Remove the S ratchet arm ③ in the direction of the arrow Ⓐ.
   Note: Do not reuse the S ratchet arm.
5) Remove the S ratchet RE plate.
6) Remove the screw (camera tapping M1.4 × 2)⑤.
7) Remove the cassette guide S ⑥ in the direction of the arrow Ⓑ.

2. Attachment procedure

1) Attach the cassette guide S ⑥ to the notch of the LS chassis block assembly with the screw (camera tapping M1.4 × 2).
2) Attach the S ratchet RE plate ④ to the shaft of the LS chassis block assembly.
3) Attach the S ratchet arm ③ to the shaft of the LS chassis block assembly. At this time, the dowel of the S ratchet RE plate ④ must be inserted into the U-shaped notch of the S ratchet arm ③.
4) Hook the S ratchet spring ② on the notch of the S ratchet arm and attach it to the notch of the LS chassis block assembly.
5) Attach the RE return plate spring ① to the notch of the LS chassis block assembly.
6) Attach the blind plate. (Refer to 4-5.)

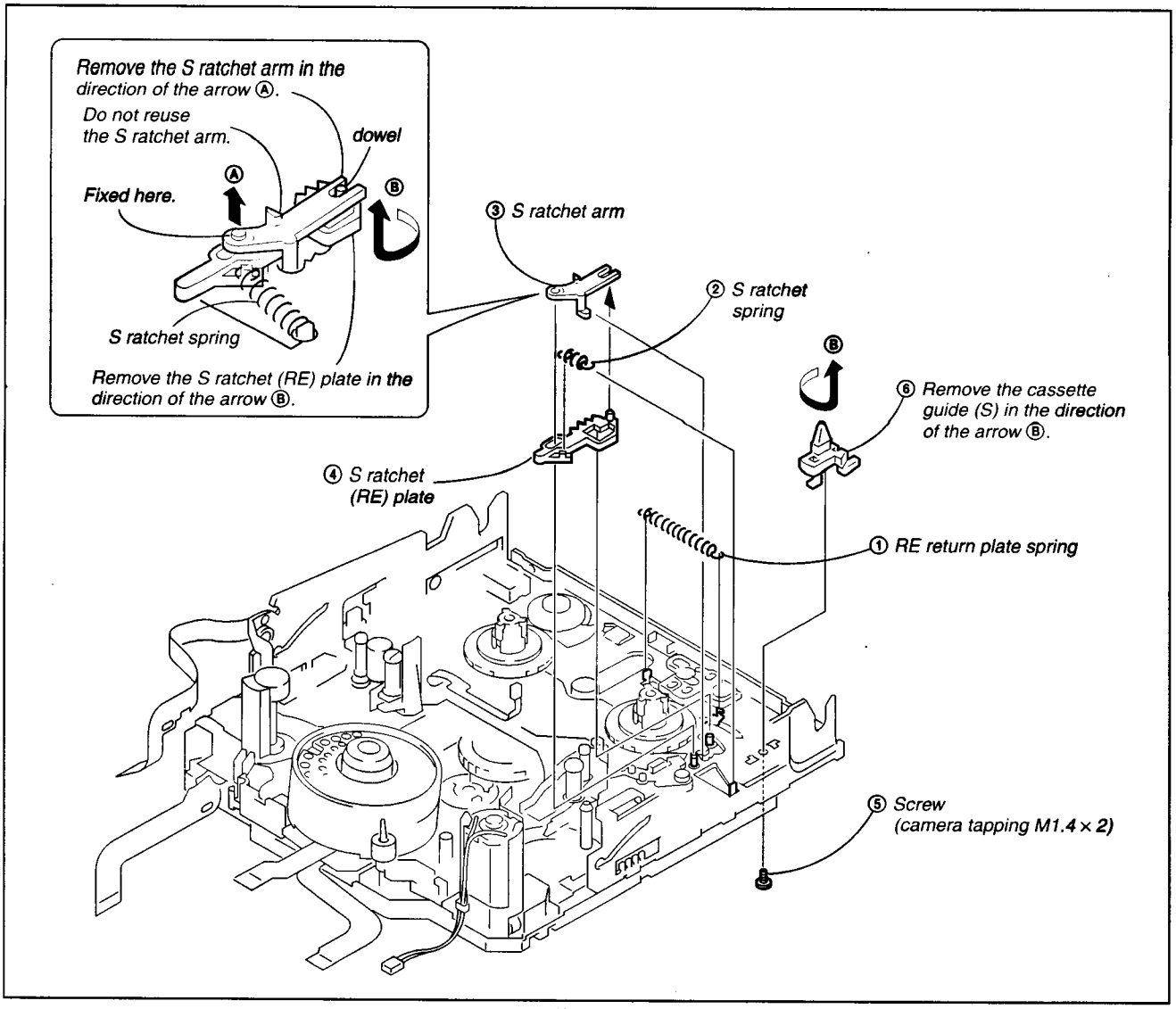

Remove the S ratchet arm in the direction of the arrow Ⓐ.
Do not reuse the S ratchet arm.
dowel
Fixed here.
Ⓐ
Ⓑ
S ratchet spring
Remove the S ratchet (RE) plate in the direction of the arrow Ⓑ.
③ S ratchet arm
② S ratchet spring
⑥ Remove the cassette guide (S) in the direction of the arrow Ⓑ.
④ S ratchet (RE) plate
① RE return plate spring
⑤ Screw (camera tapping M1.4 × 2)

Fig. 4-7.

4-8. R Drive Gear Assembly, LS Cam Plate

1. Removal procedure

1) Remove the blind plate. (Refer to 4-5.)
2) Remove the lumiler cut washer (0.98 × 3 × 0.13) ①.
3) Remove the R drive gear assembly ②.
4) Remove the HLC cut (1.8 × 4 × 0.5) ③ and the two screws (precision type3 +P1.7 × 1.8) ④.
5) Remove the LS cam plate ⑤.

2. Attachment procedure

1) Attach the R drive gear assembly ② with the lumiler cut washer (0.98 × 3 × 0.13) ①.
2) Align the LS cam plate ⑤ with the two dowels of the LS chassis block assembly, temporarily fix the LS cam plate ⑤ with the two screws (precision type3 +P1.7 × 1.8), then attach it with the HLC cut (1.8 × 4 × 0.5) ③.
3) Adjust the position of the LS cam plate. (Refer to 4-9.)

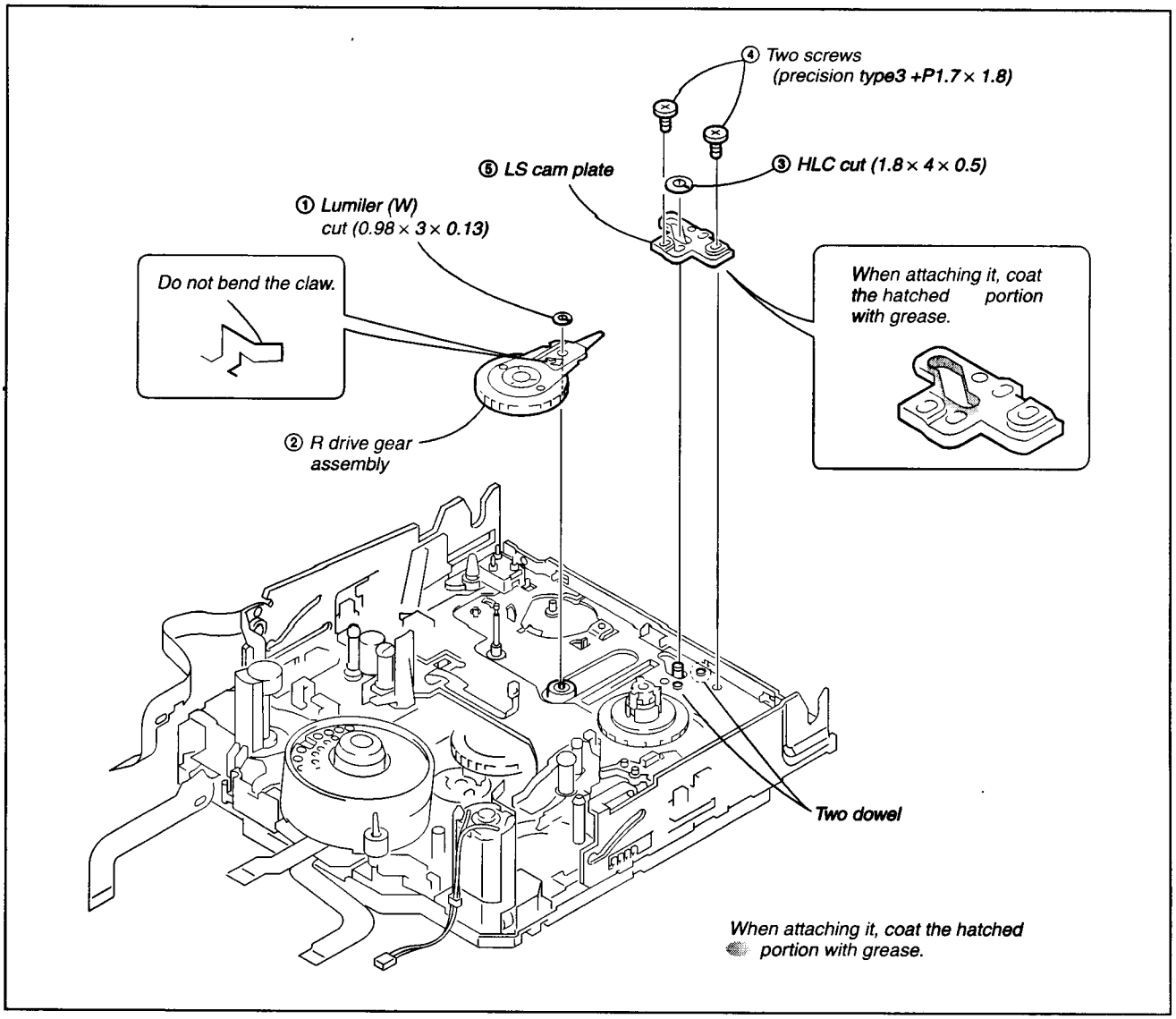

④ Two screws
(precision type3 +P1.7× 1.8)
⑤ LS cam plate
③ HLC cut (1.8× 4× 0.5)
① Lumiler (W)
cut (0.98× 3× 0.13)
Do not bend the claw.
When attaching it, coat the hatched portion with grease.
② R drive gear assembly
Two dowel
When attaching it, coat the hatched portion with grease.

Fig. 4-8.

4-9. LS Cam Plate Position Adjustment

1. Adjustment Procedure

1) Perform loading of the LS chassis block assembly ① until the tip of the guide base (S) assembly reaches the drum base assembly.
2) Loosen the two screws (precision type3 +P1.7 × 1.8) ② of the LS cam plate and slide the LS chassis block assembly to the drum side so as to remove play.
3) Insert the thickness gauge 0.6 mm (Ref. No. J-16) between the LS cam plate and the LS chassis block assembly. Push the LS cam plate in the direction opposite to the drum to remove play.
4) Fix the two screws (precision type3 +P1.7 × 1.8) ②.
Tightening torque: 0.108 ± 0.01 N•m (1.1 kgf•cm)

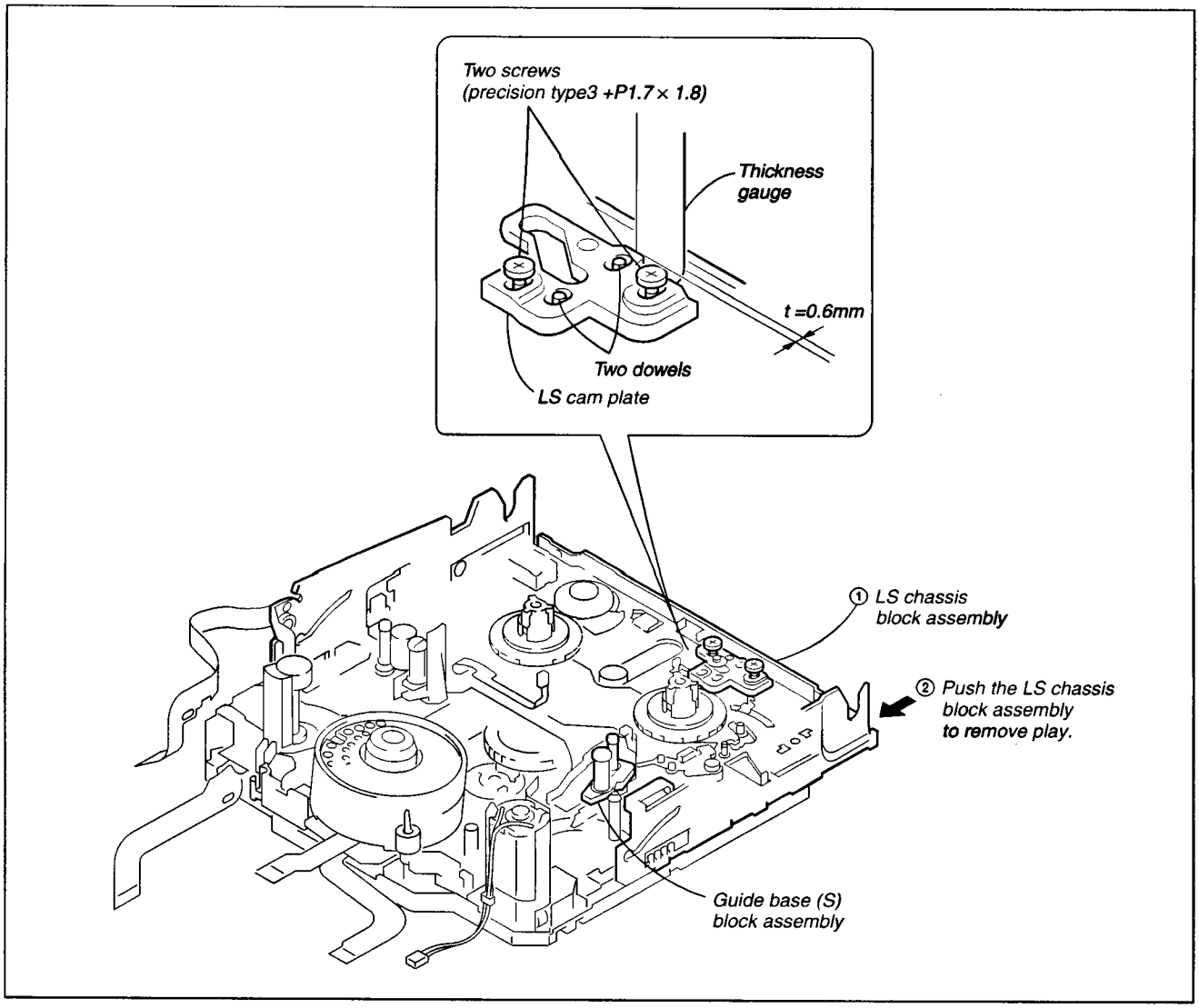


Fig. 4-9.

4-10. LS Chassis Block Assembly

1. Removal procedure

1) Move the LS chassis block assembly between USE and LOAD.
2) Remove the blind plate. (Refer to 4-5.)
3) Remove the R drive gear assembly. (Refer to 4-8.)
4) Remove the HCL cut (1.8 × 4 × 0.5) ①.
5) Remove the three screws (M1.4 × 2.5) ②.
6) Remove the LS chassis block assembly ③ in the direction of the arrow Ⓐ.

2. Attachment procedure

1) Insert the LS guide roller and LS guide T2 pin of the mechanical chassis block assembly into the slot of the LS chassis block assembly ④.
2) Insert the pin of the LS arm assembly into the cam groove on the LS cam plate, face the TG7 drive pin ⑤ in the direction of the arrow Ⓑ, and insert it to the two slot of the mechanical chassis. Then, tighten the three screws (M1.4 × 2.5) ② in the order of Ⓒ, Ⓓ and Ⓔ.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
3) Attach the HCL cut (1.8 × 4 × 0.5) ① to the pin of the LS arm assembly.
4) Attach the R drive gear assembly. (Refer to 4-8.)
5) Attach the blind plate. (Refer to 4-5.)
6) Clean the tape running path. (Refer to 2-2.)

Note: Each arm must move smoothly.

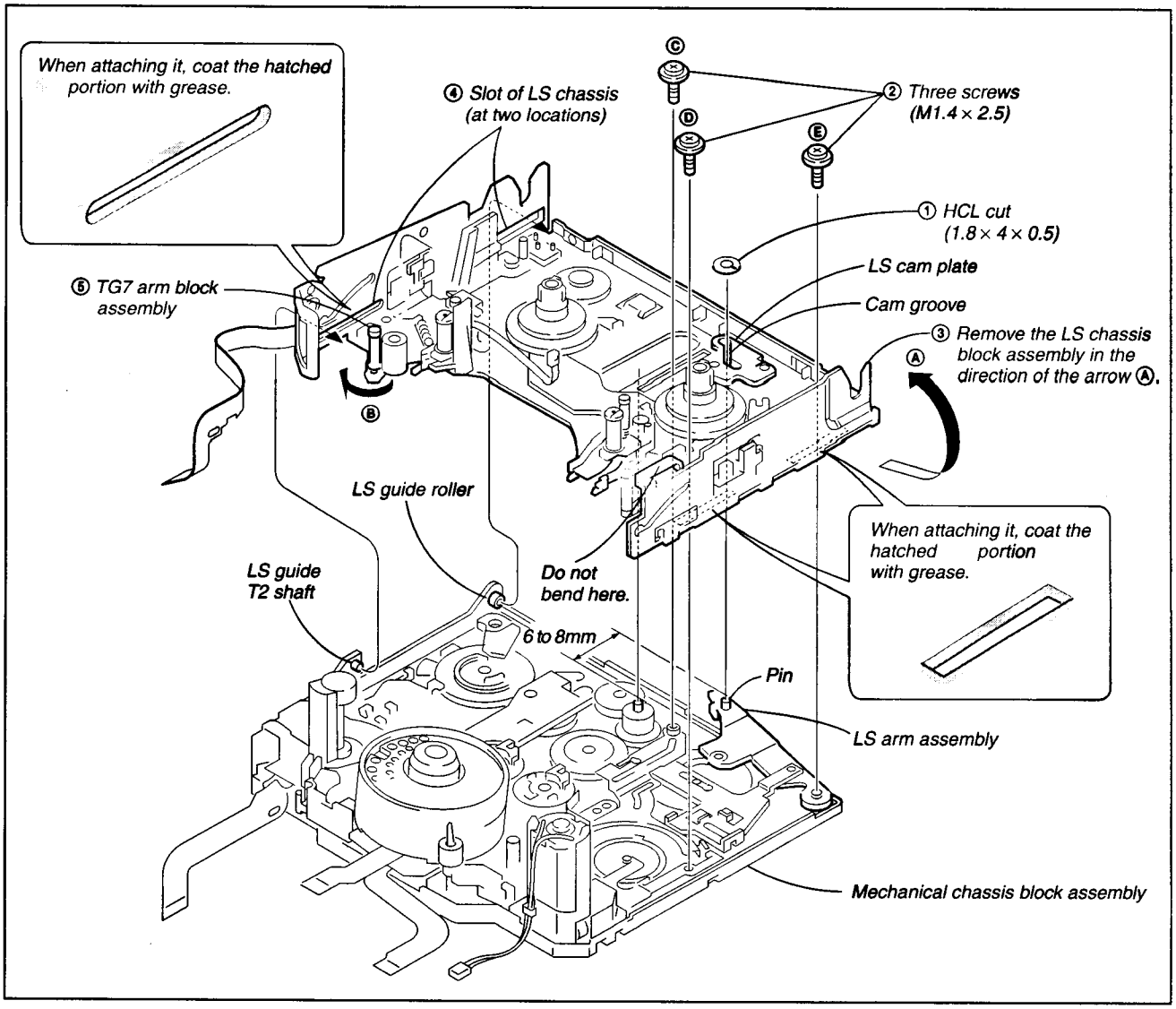

When attaching it, coat the hatched portion with grease.
④ Slot of LS chassis (at two locations)
Ⓒ
Ⓓ
Ⓔ
② Three screws (M1.4 × 2.5)
① HCL cut (1.8 × 4 × 0.5)
LS cam plate
Cam groove
⑤ TG7 arm block assembly
Ⓑ
③ Remove the LS chassis block assembly in the direction of the arrow Ⓐ.
Ⓐ
LS guide roller
LS guide T2 shaft
Do not bend here.
6 to 8mm
When attaching it, coat the hatched portion with grease.
Pin
LS arm assembly
Mechanical chassis block assembly

Fig. 4-10.

4-11. TG7 Arm Block Assembly, Pinch Arm Assembly

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Remove the screw (camera pan2 M1.4 × 1.6) ①.
3) Remove the TG7 retainer ② in the direction of the arrow.
4) Remove the TG7 arm block assembly ⑥ and TG7 arm spring ⑦.
5) Remove the pinch roller arm assembly ③.
6) Remove the P lim arm roller ④ and pinch arm load spring ⑤.

2. Attachment procedure

1) Attach the P lim arm roller ④ to the pinch roller arm assembly ③.
2) Insert one end of the pinch arm load spring ⑤ into the hole on the rising metal sheet of the LS chassis block assembly, and hook the other end of the spring on the position setting protrusion of the LS-057 board.
3) Attach the pinch roller arm assembly ③ to the shaft of the LS chassis block assembly, and hook the pinch arm load spring ⑤ on the rising metal sheet of the pinch roller assembly ③.
4) Hook the TG7 arm spring ⑦ on the shaft of the LS chassis block assembly while the hook side of the spring is facing downward.
5) When attaching the TG7 arm block assembly ⑥ to the shaft of the LS chassis block assembly, hook the hook side of the TG7 arm spring ⑦ on the rising metal sheet of the LS chassis block assembly and hook the top side of the spring to the notch of the TG7 arm block assembly ⑥.
6) Attach the TG7 retainer ② with the screw (camera pan2 M1.4 × 1.6) ①.
7) Remove the LS chassis block assembly. (Refer to 4-10.)
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
8) Clean the tape running path. (Refer to 2-2.)

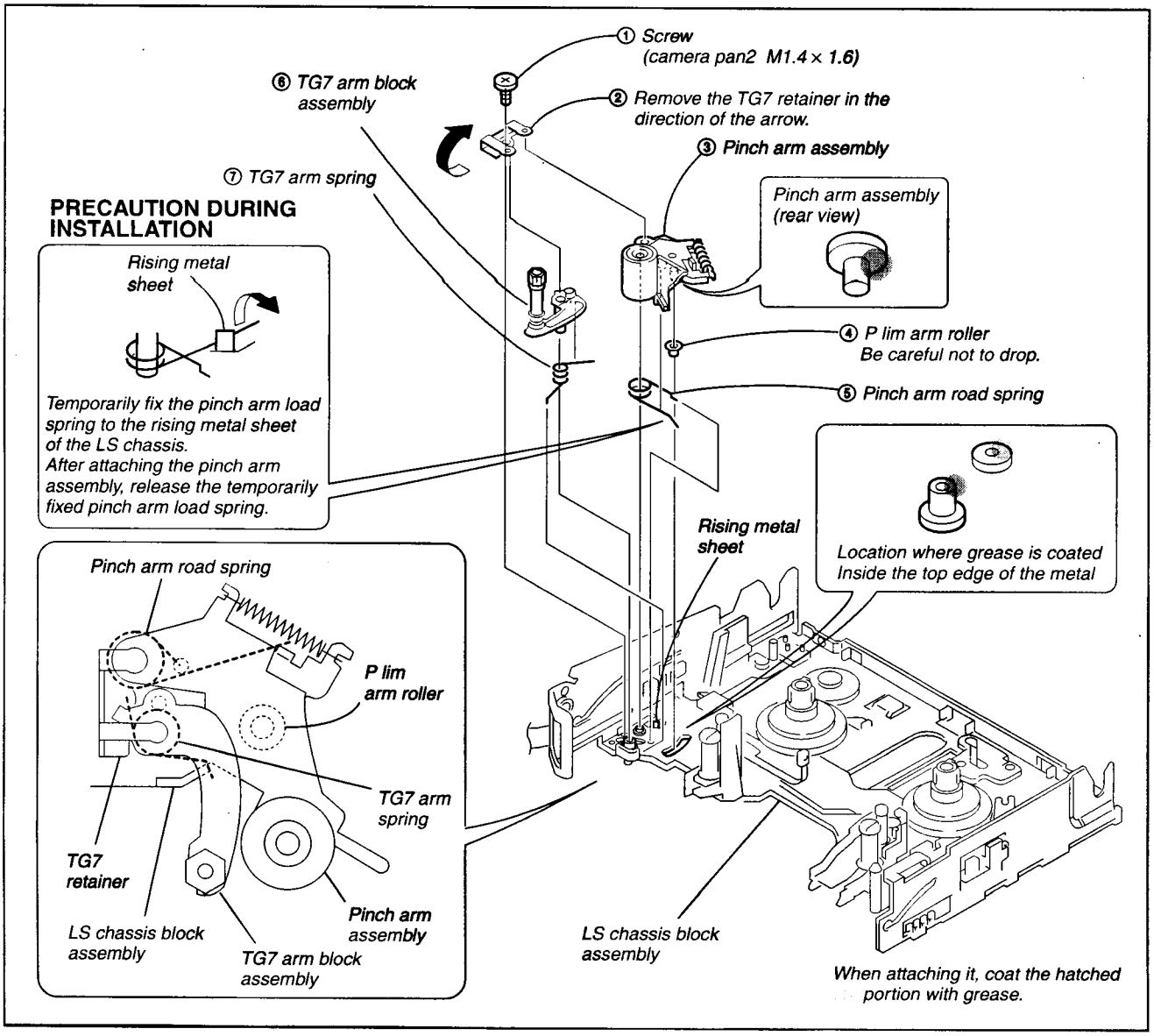

① Screw
(camera pan2 M1.4 × 1.6)
⑥ TG7 arm block assembly
② Remove the TG7 retainer in the direction of the arrow.
③ Pinch arm assembly
⑦ TG7 arm spring
Pinch arm assembly (rear view)
PRECAUTION DURING INSTALLATION
Rising metal sheet
Temporarily fix the pinch arm load spring to the rising metal sheet of the LS chassis.
After attaching the pinch arm assembly, release the temporarily fixed pinch arm load spring.
④ P lim arm roller
Be careful not to drop.
⑤ Pinch arm road spring
Rising metal sheet
Location where grease is coated Inside the top edge of the metal
Pinch arm road spring
P lim arm roller
TG7 arm spring
TG7 retainer
LS chassis block assembly
TG7 arm block assembly
Pinch arm assembly
LS chassis block assembly
When attaching it, coat the hatched portion with grease.

Fig. 4-11.

4-12. Guide Base (T) Block Assembly, Guide Base (S) Block Assembly

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Align the claw of the guide base (T) block assembly ① with the notch of the guide arm T and remove the guide base (T) block assembly.
3) Remove the screw (M1.4 × 2.5) ② and remove the guide rail (T) ③.
4) Align the claw of the guide base (S) block assembly ④ with the notch of the guide arm S and remove the guide base (S) block assembly.
5) Remove the screw (M1.4 × 2.5) ⑤ and remove the guide rail (S) ⑥.

2. Attachment procedure

1) Align the holes on the guide rail (S) ⑥ with the protrusions (at two locations) of the LS chassis block assembly and attach the guide rail (S) ⑥ with the screw (M1.4 × 2.5) ⑤.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
2) Attach the guide base (S) block assembly ④ while aligning it with the groove on the guide arm S.
3) Align the holes on the guide rail (T) ③ with the protrusions (at two locations) of the LS chassis block assembly and attach the guide rail (T) ③ with the screw (M1.4 × 2.5) ②.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
4) Attach the guide base (T) block assembly ① while aligning it with the groove on the guide arm T.
   Note: Do not forget to hook the plate spring.
5) Withdraw the joint portion of the guide arm S and the guide arm T in the directions of the arrows Ⓐ and Ⓑ.
6) Attach the LS chassis block assembly to the mechanical chassis. (Refer to 4-10.)
7) Clean the tape running path. (Refer to 2-2.)

Note: Be careful of the shape of the guide base T/S block assembly.
Guide base (T) block assembly = Guide base (small)
Guide base (S) block assembly = Guide base (large)

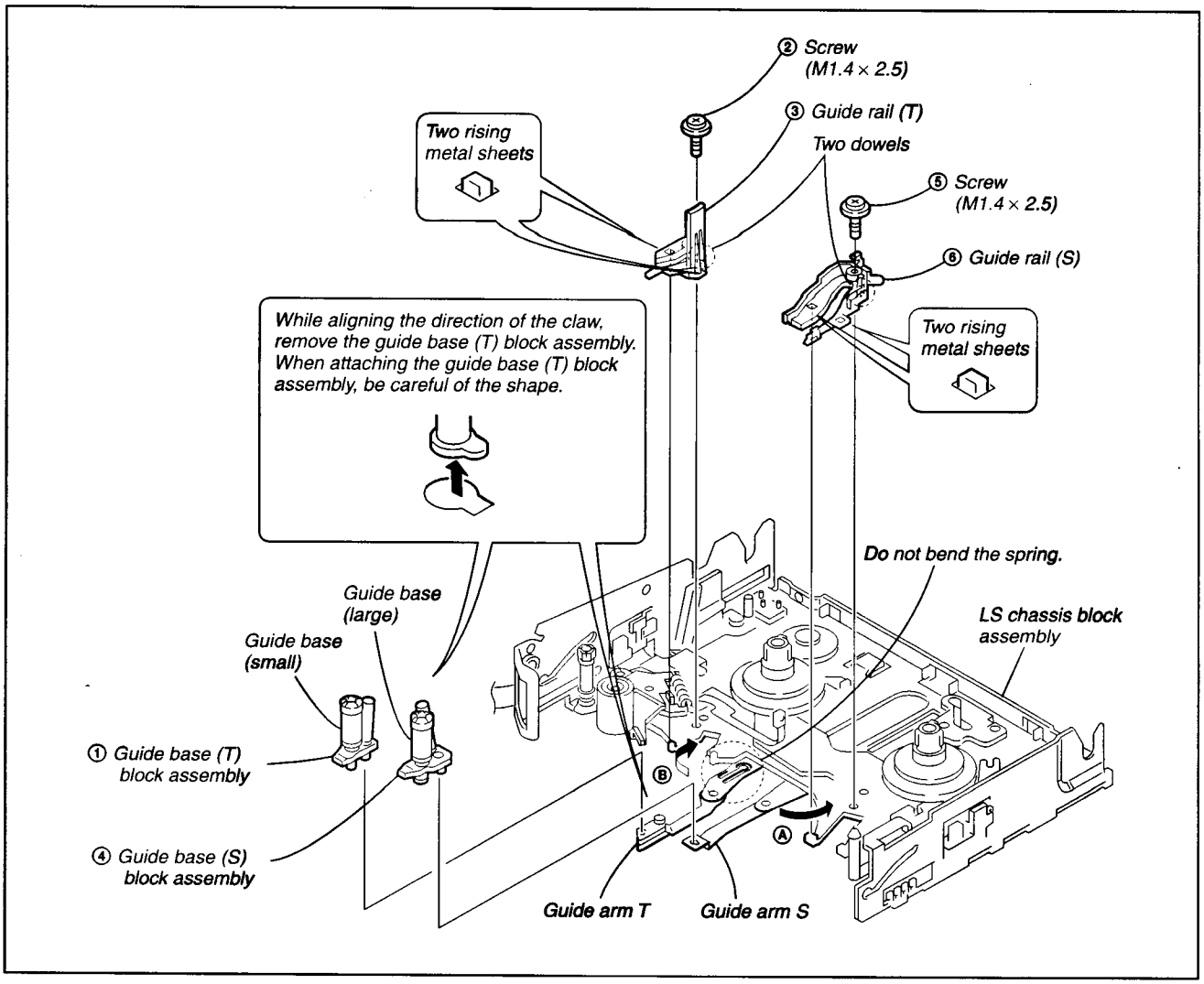

② Screw (M1.4 × 2.5)
③ Guide rail (T)
Two dowels
Two rising metal sheets
⑤ Screw (M1.4 × 2.5)
⑥ Guide rail (S)
Two rising metal sheets
While aligning the direction of the claw, remove the guide base (T) block assembly. When attaching the guide base (T) block assembly, be careful of the shape.
Do not bend the spring.
LS chassis block assembly
Guide base (large)
Guide base (small)
① Guide base (T) block assembly
④ Guide base (S) block assembly
Ⓑ
Ⓐ
Guide arm T
Guide arm S

Fig. 4-12.

4-13. TG1 Arm, Reel Table (S) Assembly, Push Switch (3Key)

1. Removal procedure

1) Remove the TG1 arm spring ①.
   Note: Take note of the position where the spring has been hooked.
2) Remove the TG1 arm ②.
3) Open the claw of the reel table (S) assembly ④ in the directions of the arrows Ⓑ and Ⓒ and remove the reel table S assembly.
4) Remove the RVS arm spring ⑤.
5) Rotate the S ratchet arm ③ in the direction of the arrow Ⓐ and remove the BT band assembly ⑥.
6) Remove the lock guide ⑦.
7) Remove the four solderings of the LS-057 board.
8) Remove the two claws ⑨ of the cassette guide T ⑫ from the notch of the LS chassis.
9) Remove the push switch (3key) ⑪ by releasing the two claws of the cassette guide T ⑫.

2. Attachment procedure

1) Attach the push switch (3key) ⑪ to the cassette guide T ⑫ with the two claws ⑩.
2) Attach the cassette guide T ⑫ to the notch of the LS chassis block assembly with the two claws ⑨.
3) Solder the cassette guide T ⑫ to the LS-057 board at the four locations.
4) Attach the lock guide ⑦.
5) Attach the BT band assembly ⑥.
6) Check the location of the reel table S ④. Then, rotate the S ratchet arm ③ in the direction of the arrow Ⓐ and insert the band of the BT band assembly ⑥ into the groove on the side.
7) Attach the BT band assembly to the TG1 arm ② and attach it to the mechanism chassis block assembly.
8) Check the shape of the hook of the TG1 arm spring ①. Hook one end of the spring on the TG1 arm ②. Then, hook the other end of the spring on the same location of the LS chassis block assembly where you have taken note when the spring is removed.
9) Attach the RVS arm spring.
10) Check the TG1 back-tension. (Refer to 5-1.)
    Note: The BT band assembly ⑤ must be completely inserted into the groove on the side of the reel table (S) ④.

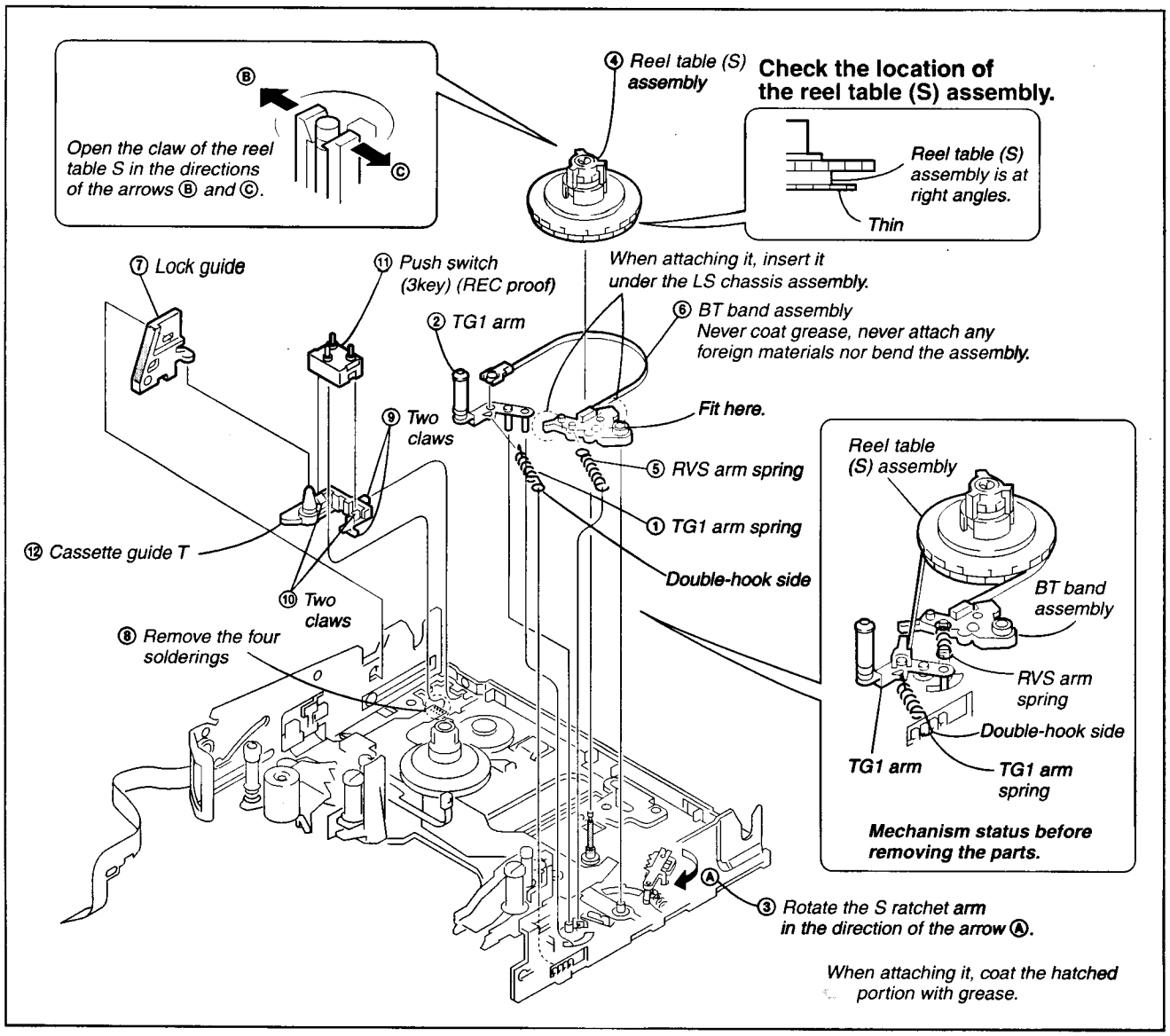

Ⓑ
Open the claw of the reel table S in the directions of the arrows Ⓑ and Ⓒ.
Ⓒ
④ Reel table (S) assembly
Check the location of the reel table (S) assembly.
Reel table (S) assembly is at right angles.
Thin
⑦ Lock guide
⑪ Push switch (3key) (REC proof)
When attaching it, insert it under the LS chassis assembly.
② TG1 arm
⑥ BT band assembly
Never coat grease, never attach any foreign materials nor bend the assembly.
⑨ Two claws
Fit here.
⑤ RVS arm spring
① TG1 arm spring
Double-hook side
⑫ Cassette guide T
⑩ Two claws
⑧ Remove the four solderings
Reel table (S) assembly
BT band assembly
RVS arm spring
Double-hook side
TG1 arm
TG1 arm spring
Mechanism status before removing the parts.
Ⓐ
③ Rotate the S ratchet arm in the direction of the arrow Ⓐ.
When attaching it, coat the hatched portion with grease.

Fig. 4-13.

4-14. Hall Element (H001, H002 (T/S Reel)), Photo Transistor (Q001, Q002 (Tape Top/Tape End), D001 (Tape LED)), LED (D001 (Tape LED))

1. Removal procedure

1) Remove the LS chassis block assembly. **(Refer to 4-10.)**
2) Remove the LS grease cover.
3) Remove the two solderings and remove Q001 (tape top).
4) Remove the two solderings and remove Q002 (tape end).
5) Remove the two solderings and remove D001 (tape LED).
6) Remove the four solderings respectively from H001 (T reel) and H002 (S reel) and remove the H001 and H002.

2. Attachment procedure

1) Solder H001 (T reel) and H002 (S reel) respectively at the four locations.
2) Solder Q002 (tape end) at the two locations.
3) Solder Q001 (tape top) at the two locations.
4) Solder D001 (tape LED) at the two locations.
5) Attach the LS grease cover.
6) Attach the LS chassis block assembly to the mechanical chassis. (Refer to 4-10.)

Note: Be careful of the plarities of the Hall element (H001, H002), Photo-transistor (Q001, Q002) and LED (D001).

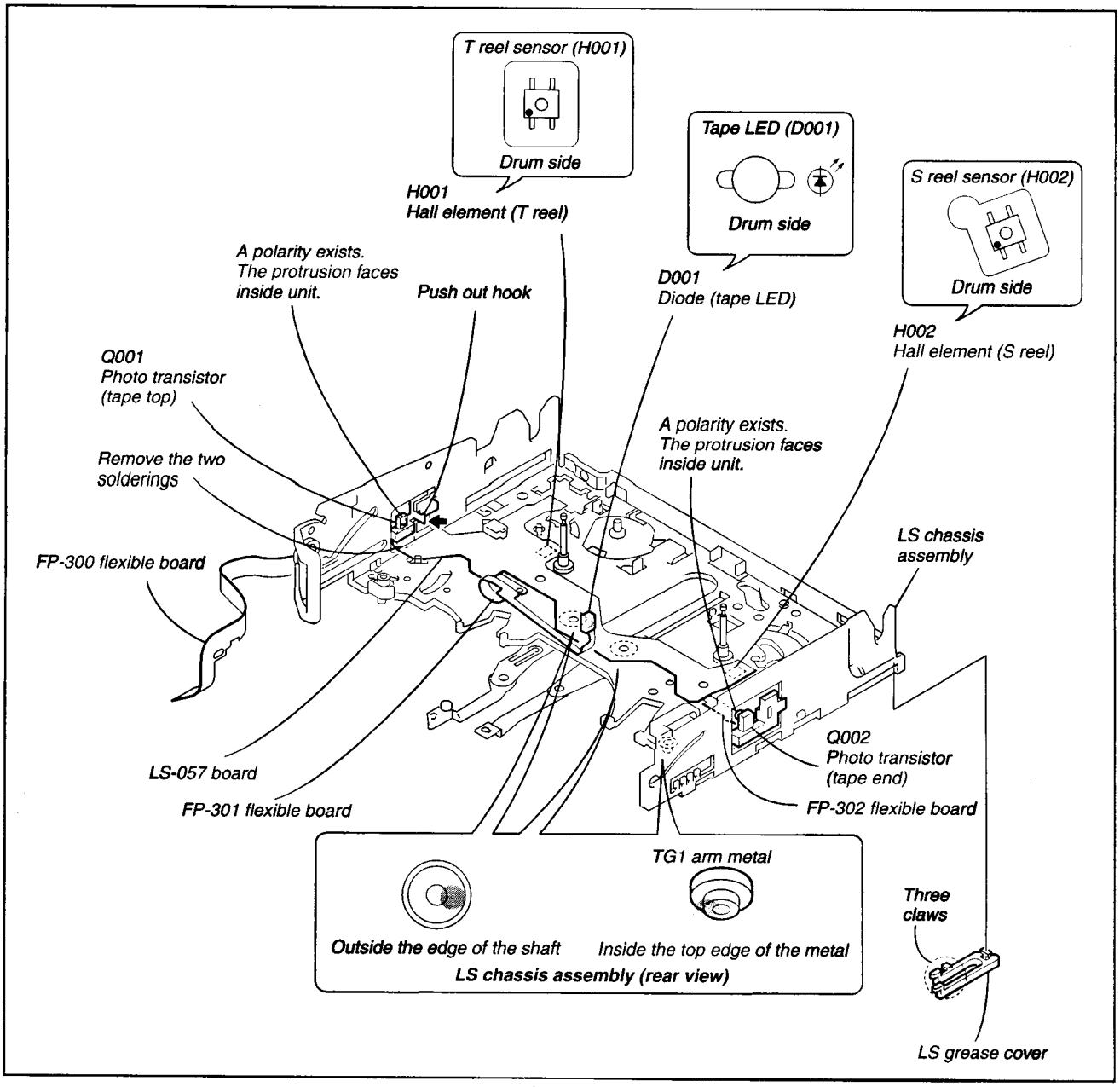


Fig. 4-14.

4-15. LS Guide Roller, Guide Lock Plate (T), Pinch Pusher Assembly, Eject Arm

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Remove the LS guide roller ①.
3) Remove the P pressure plate spring ②.
4) Remove the HLW cut (0.98 × 3 × 0.25) ③.
5) Remove the pitch pressure plate assembly ④ in the direction of the arrow Ⓐ.
6) Remove the relay gear ⑤.
7) Remove the screw (camera pan2 M1.4 × 1.6) ⑥.
8) Remove the guide lock plate (T) ⑦ in the direction of the arrow Ⓑ.
9) Remove the eject arm spring ⑧ and HLW cut (0.98 × 3 × 0.25) ⑨.
   Note: Do not reuse the HLW cut.
10) Remove the eject arm ⑩.

2. Attachment procedure

1) Attach the eject arm spring ⑧ to the eject arm ⑩.
2) Hook one end of the eject arm spring ⑧ on the protrusion of the main chassis block assembly and attach the eject arm to the shaft.
3) Attach the HLW cut (0.98 × 3 × 0.25) ⑨.
   Do not reuse the HLW cut.
4) Attach the guide lock plate T ⑦ while aligning it with the notches Ⓒ and Ⓓ.
5) Attach the screw (camera pan2 M1.4 × 1.6) ⑥.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
6) Attach the relay gear ⑤.
7) Attach the pinch pusher plate ④ with the HLW cut (0.98 × 3 × 0.25) ③.
8) Attach the P pressure plate spring ②.
   Insert the concave side of the LS guide roller ① into the shaft to attach the LS guide roller.
   Note: Insert the roller completely.
9) Attach the LS chassis block assembly to the mechanical chassis. (Refer to 4-10.)

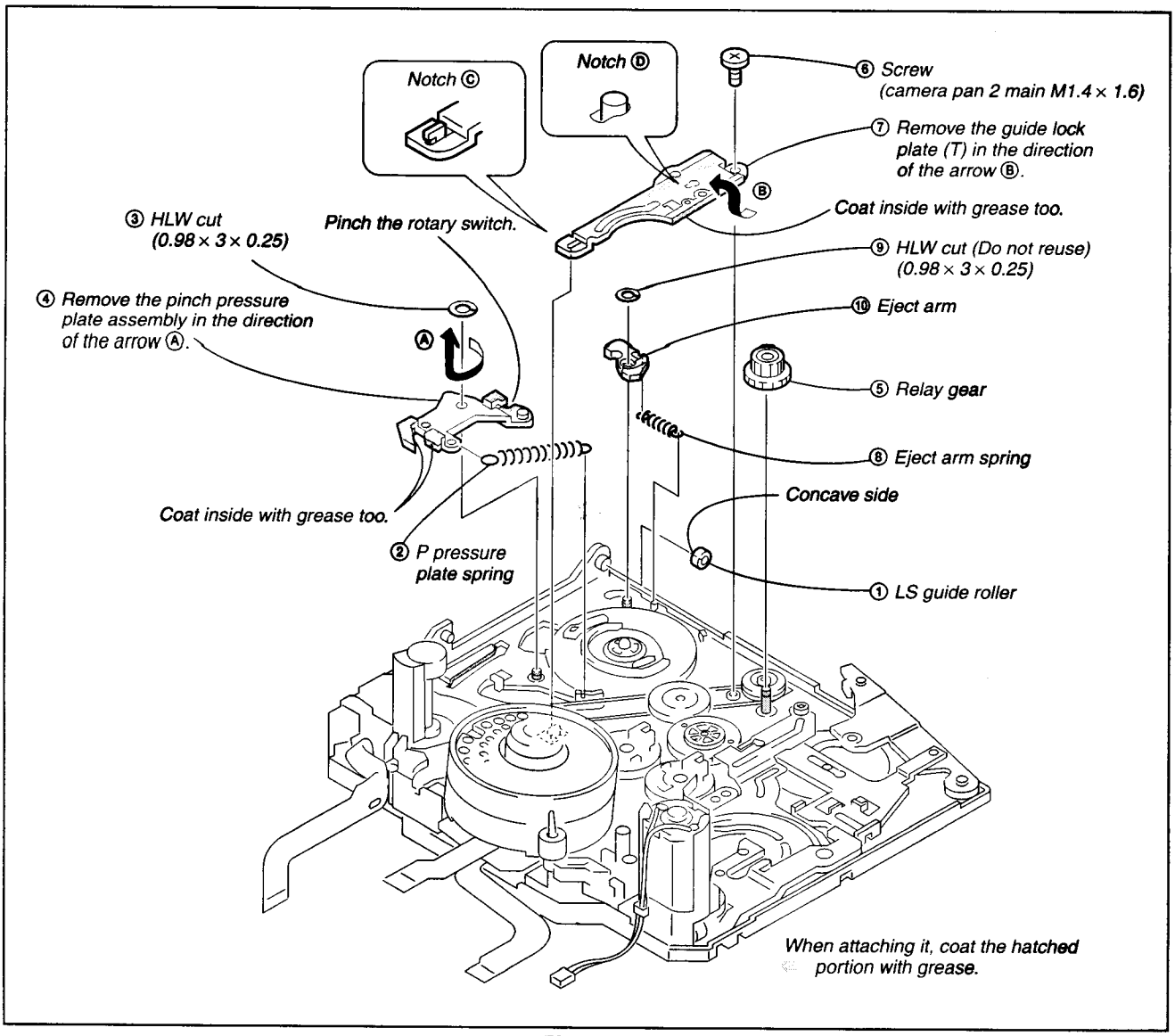

Notch Ⓒ
Notch Ⓓ
⑥ Screw (camera pan 2 main M1.4 × 1.6)
⑦ Remove the guide lock plate (T) in the direction of the arrow Ⓑ.
Ⓑ
Coat inside with grease too.
③ HLW cut (0.98 × 3 × 0.25)
Pinch the rotary switch.
⑨ HLW cut (Do not reuse) (0.98 × 3 × 0.25)
④ Remove the pinch pressure plate assembly in the direction of the arrow Ⓐ.
Ⓐ
⑩ Eject arm
⑤ Relay gear
⑧ Eject arm spring
Concave side
Coat inside with grease too.
② P pressure plate spring
① LS guide roller
When attaching it, coat the hatched portion with grease.

Fig. 4-15.

4-16. Rotary Switch, Cam Relay Gear, Change Gear Assembly, Timing Belt

Before replacing the timing belt, remove the guide rail T2 and capstan motor. (Refer to 4-4.)

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Remove the guide lock plate (T), pinch pressure assembly and eject arm. (Refer to 4-15.)
3) Remove the cam relay gear ①.
4) Remove the timing belt ②.
5) Remove the HLW cut (0.98 × 3 × 0.25) ③ and change gear assembly ④.
6) Remove the four solderings ⑤ and remove the FP-299 flexible wiring board ⑥.
7) Push up the dowel of the rotary switch ⑦ from the bottom of the mechanism chassis assembly and remove the rotary switch in the direction of the arrow.

2. Attachment procedure

1) Insert the dowel of the rotary switch ⑦ into the hole on the mechanism chassis assembly and attach the rotary switch clockwise.
2) Align the FP-299 flexible wiring board ⑥ with the reference hole on the mechanism chassis and solder the flexible wiring board to the rotary switch ⑦ (at four locations).
3) Attach the change gear assembly ④ with the HLC cut (0.98 × 3 × 0.25)③.
4) Attach the timing belt ②.
   Note: There must be a clearance between the rotary switch ⑦ and timing belt ②.
5) Attach the cam relay gear ①.
   The in-phase markings of the rotary switch ⑦, cam relay gear (2) and cam relay gear (1) must be aligned.
6) Attach the guide lock plate (T), pinch pressure assembly and eject arm. (Refer to 4-15.)
7) Attach the LS chassis block assembly to the mechanical chassis. (Refer to 4-10.)
8) Clean the shaft of the capstan motor. (Refer to 2-2.)

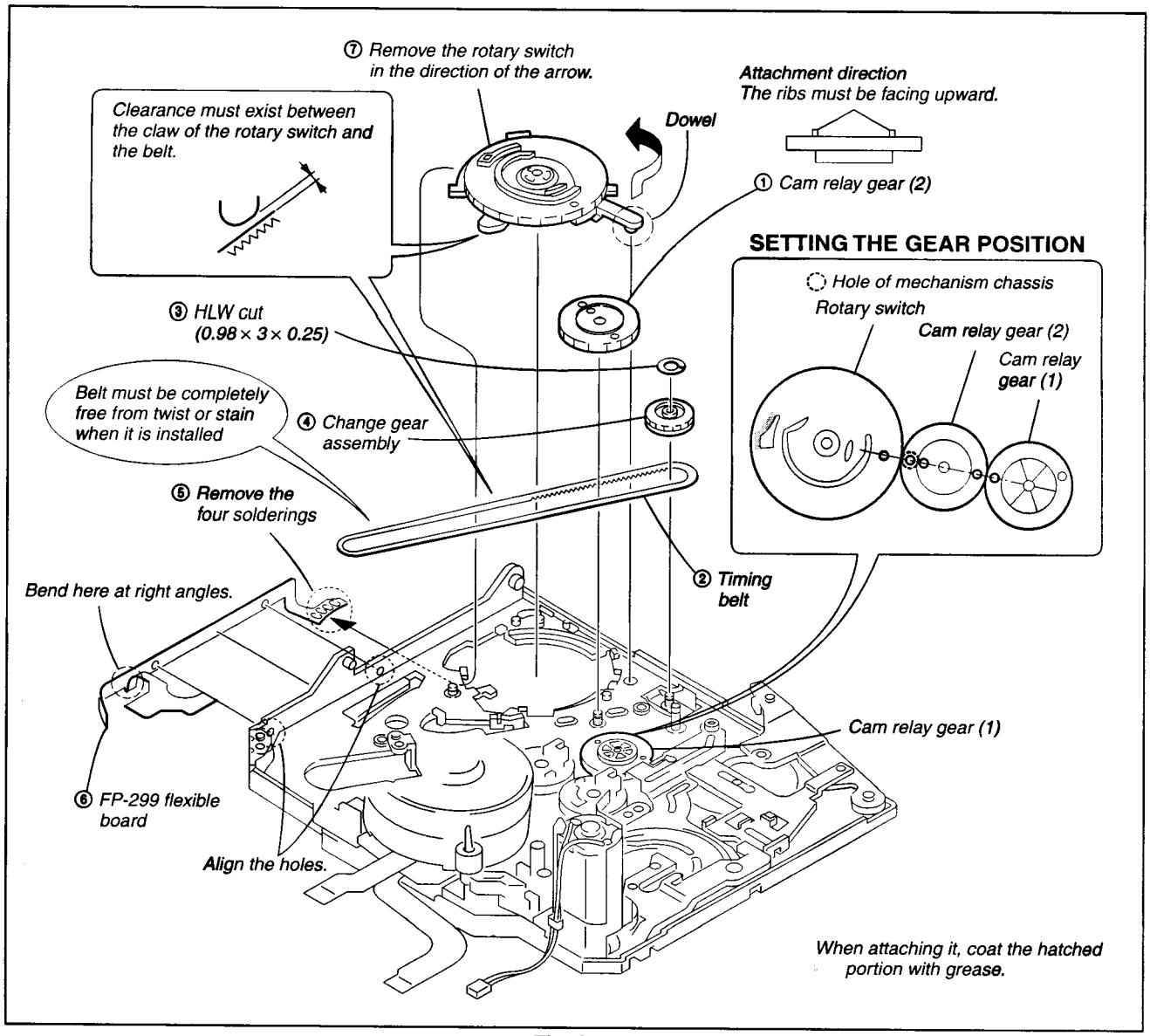

⑦ Remove the rotary switch in the direction of the arrow.
Attachment direction
The ribs must be facing upward.
Clearance must exist between the claw of the rotary switch and the belt.
Dowel
① Cam relay gear (2)
SETTING THE GEAR POSITION
Hole of mechanism chassis
Rotary switch
Cam relay gear (2)
Cam relay gear (1)
③ HLW cut (0.98 × 3 × 0.25)
Belt must be completely free from twist or stain when it is installed
④ Change gear assembly
⑤ Remove the four solderings
② Timing belt
Bend here at right angles.
Cam relay gear (1)
⑥ FP-299 flexible board
Align the holes.
When attaching it, coat the hatched portion with grease.

Fig. 4-16.

4-17. Guide Gear Assembly, Guide Gear T Assembly, Cam Relay Gear 1, Guide Lock Plate (S)

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Remove the screw (camera pan2 main M1.4 × 1.6) ①.
3) Remove the guide lock plate (S) ② in the direction of the arrow Ⓐ.
4) Remove the two stop rings (E type 1.2) ③.
5) Remove the guide gear (S) assembly ④ and guide gear (T) assembly ⑤.
6) Remove the HLW cut (0.98 × 3 × 0.25) ⑥.
7) Remove the cam relay gear (1) ⑦.

2. Attachment procedure

1) Attach the cam relay gear (1) ⑦ with the HLW cut (0.98 × 3 × 0.25) ⑥.
   Note: The in-phase markings of the cam relay gear (1) ⑦, cam gear (2) and cam relay gear must be aligned.
2) Attach the guide gear (T) assembly ⑤ and guide gear (S) assembly ④ to the shaft in this order and adjust the positions. Then, attach them with the two stop rings (E type 1.2) ③.
   Note1: The in-phase markings of the GL arm assembly, guide gear (S) ④ and guide gear (T) ⑤ must be aligned.
   Note2: The guide gear assembly (S/T) has a different shape respectively. Pay attention to the shapes.
3) Fit the guide lock plate (S) ② in the groove on the shaft and insert the portion Ⓑ into the notch. Then, attach the plate with the screw (camera pan2 main M1.4 × 1.6) ①.
   Tightening torque: 0.078 ± 0.01 N•m (0.8 ± 0.1 kgf•cm)
4) Attach the LS chassis block assembly to the mechanical chassis. (Refer to 4-10.)

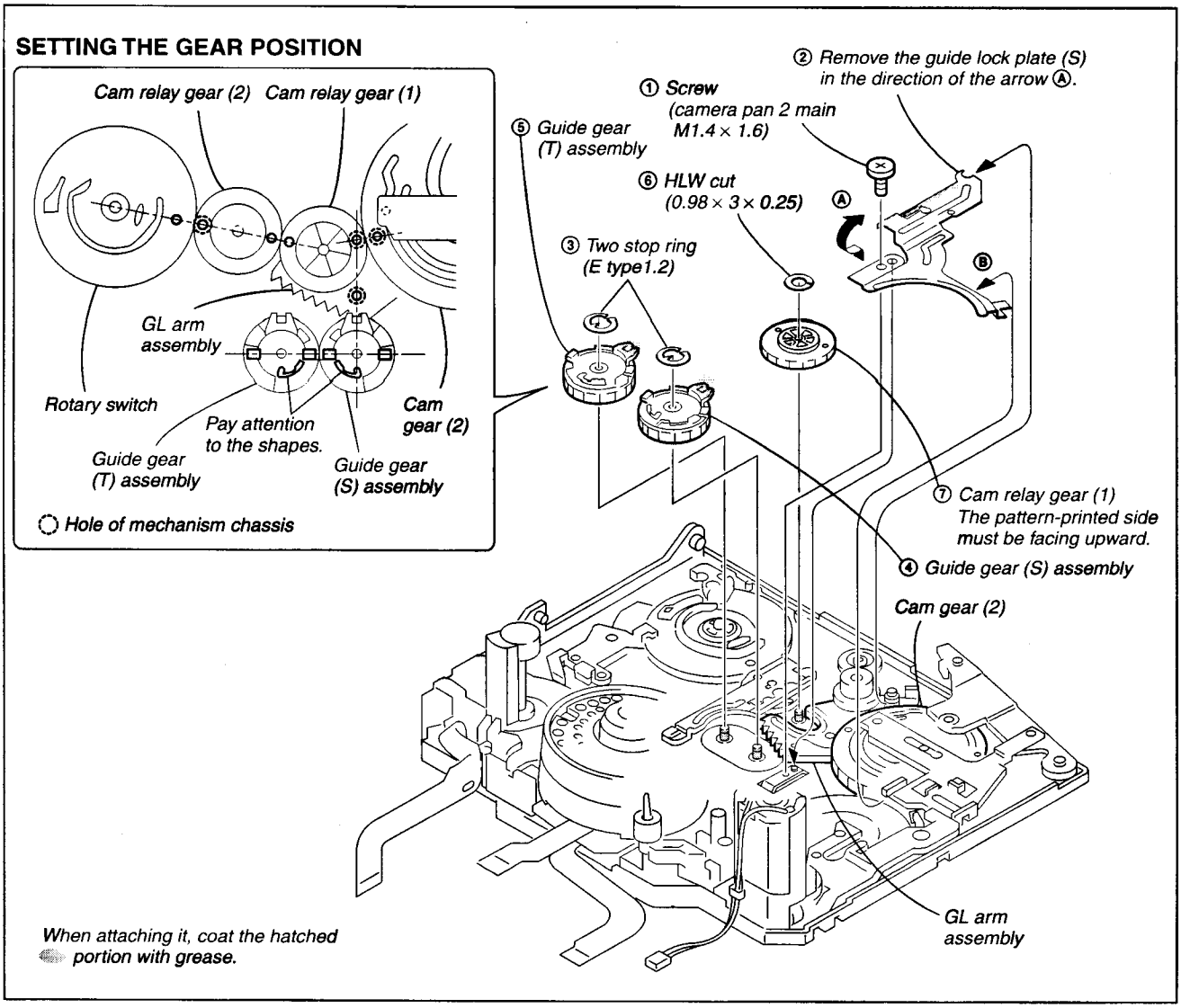

SETTING THE GEAR POSITION
Cam relay gear (2)
Cam relay gear (1)
GL arm assembly
Rotary switch
Pay attention to the shapes.
Cam gear (2)
Guide gear (T) assembly
Guide gear (S) assembly
Hole of mechanism chassis
② Remove the guide lock plate (S) in the direction of the arrow Ⓐ.
① Screw (camera pan 2 main M1.4 × 1.6)
⑤ Guide gear (T) assembly
⑥ HLW cut (0.98 × 3 × 0.25)
③ Two stop ring (E type1.2)
⑦ Cam relay gear (1) The pattern-printed side must be facing upward.
④ Guide gear (S) assembly
Cam gear (2)
GL arm assembly
When attaching it, coat the hatched portion with grease.

Fig. 4-17.

4-18. LD Gear 4, Cam Gear 1, HC Drive Arm

Remove in advance the HCL arm assembly and loading motor assembly beforehand. (Refer to 4-2.)

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Remove the guide lock plate (S). (Refer to 4-17.)
3) Remove the cover sheet ① and LD gear (4) ②.
4) Remove the T1 limiter arm ③ and cam gear (1) ④.
5) Remove the HC drive arm ⑤ in the direction of the arrow.

2. Attachment procedure

1) Attach the HC drive arm ⑤ under the drive base assembly.
2) Attach the cam gear (1) ④.
   The dowel of the HC drive arm ⑤ must be inserted into the groove on the lower side of the cam gear (1) ④.
   The in-phase markings of the cam gear (1) ④, cam gear (2) and cam relay gear (1) must be aligned.
3) Attach the LD gear (4) ② with the cover sheet ①.
4) Attach the guide plate (S).
5) Attach the LS chassis block assembly to the mechanical chassis. (Refer to 4-10.)
6) Clean the tape running path. (Refer to 2-2.)

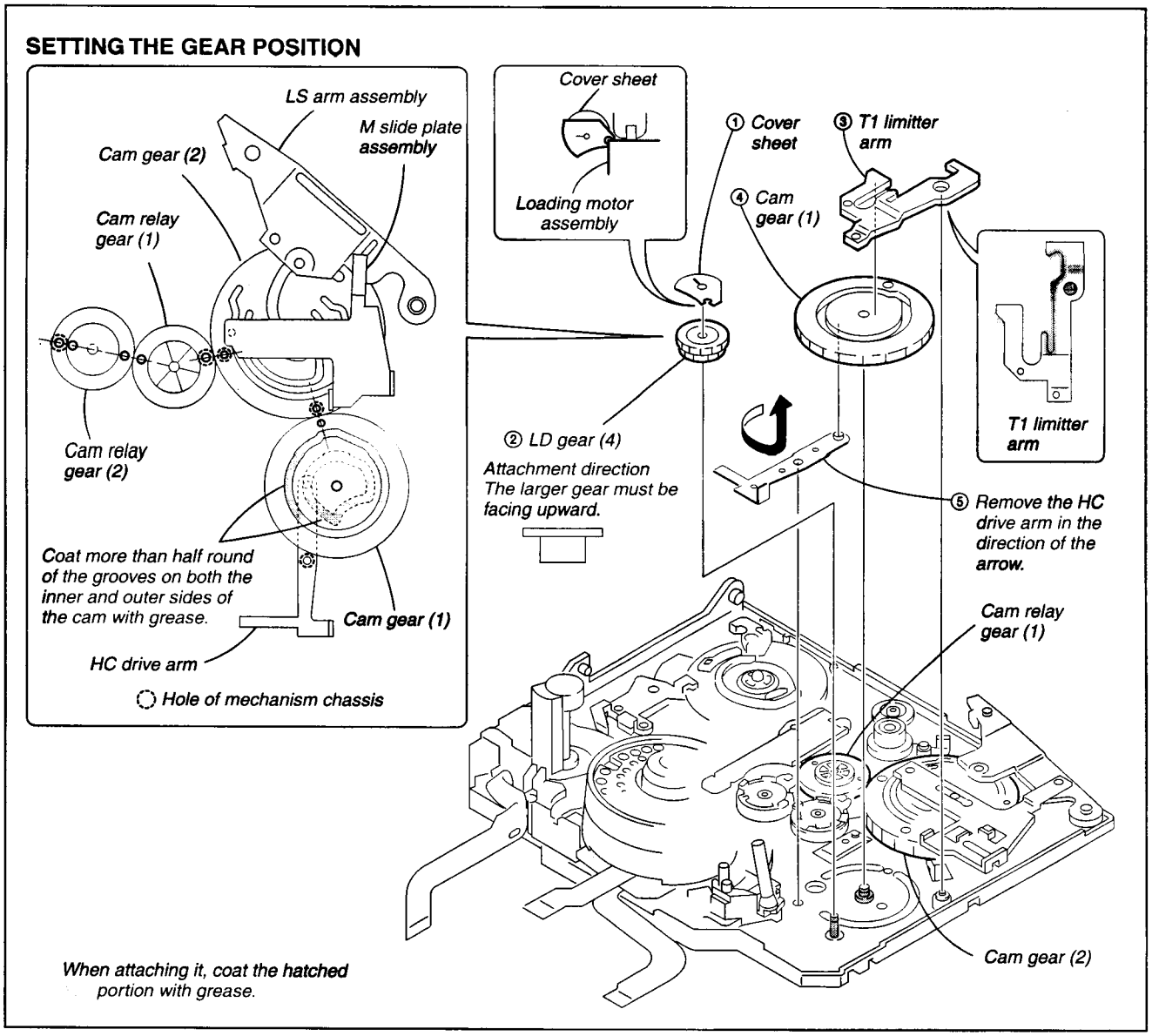

SETTING THE GEAR POSITION
LS arm assembly
M slide plate assembly
Cam gear (2)
Cam relay gear (1)
Cam relay gear (2)
Coat more than half round of the grooves on both the inner and outer sides of the cam with grease.
Cam gear (1)
HC drive arm
Hole of mechanism chassis
Cover sheet
Loading motor assembly
① Cover sheet
③ T1 limitter arm
④ Cam gear (1)
② LD gear (4)
Attachment direction
The larger gear must be facing upward.
T1 limitter arm
⑤ Remove the HC drive arm in the direction of the arrow.
Cam relay gear (1)
Cam gear (2)
When attaching it, coat the hatched portion with grease.

Fig. 4-18.

4-19. M Slide Plate Assembly, LS Arm Assembly, Cam Gear 2, GL Arm Assembly

1. Removal procedure

1) Remove the LS chassis block assembly. (Refer to 4-10.)
2) Remove the guide lock plate (S) (Refer to 4-17.)
3) Remove the relay gear ①.
4) Remove the M slide plate assembly ② in the direction of the arrow Ⓐ.
5) Remove the LS arm assembly ③ and LS arm roller ④.
6) Remove the cam gear (2) ⑤.
7) Remove the GL arm assembly ⑥ from the lower side of the cam relay gear (1) in the direction of the arrow Ⓑ.

Note: After removing the GL arm assembly, fix the guide gear (S/T) assembly.

2. Attachment procedure

1) Attach the GL arm assembly ⑥ to the shaft so that the GL arm assembly ⑥ is positioned under the cam relay gear (1).
   Note: The in-phase markings of the guide gear (S/T) assembly and GL arm assembly ⑥ must be aligned.
2) While aligning the cam gear (2) ⑤ with the dowel of the GL arm assembly, attach the cam gear (2) ⑤.
   Note: The in-phase markings of the cam relay gear (1), cam gear (1) and cam gear (2) ⑤ must be aligned.
3) Attach the LS arm roller ④ to the LS arm assembly ③. While aligning them with the cam groove on the cam gear (2) ⑤, attach them.
4) Attach the M slide plate assembly ②.
5) Attach the relay gear ①.
6) Attach the guide lock plate (S). (Refer to 4-17.)
7) Attach the LS chassis block assembly to the mechaical chassis. (Refer to 4-10.)

Note: Check that the in-phase marking of each gear is aligned.

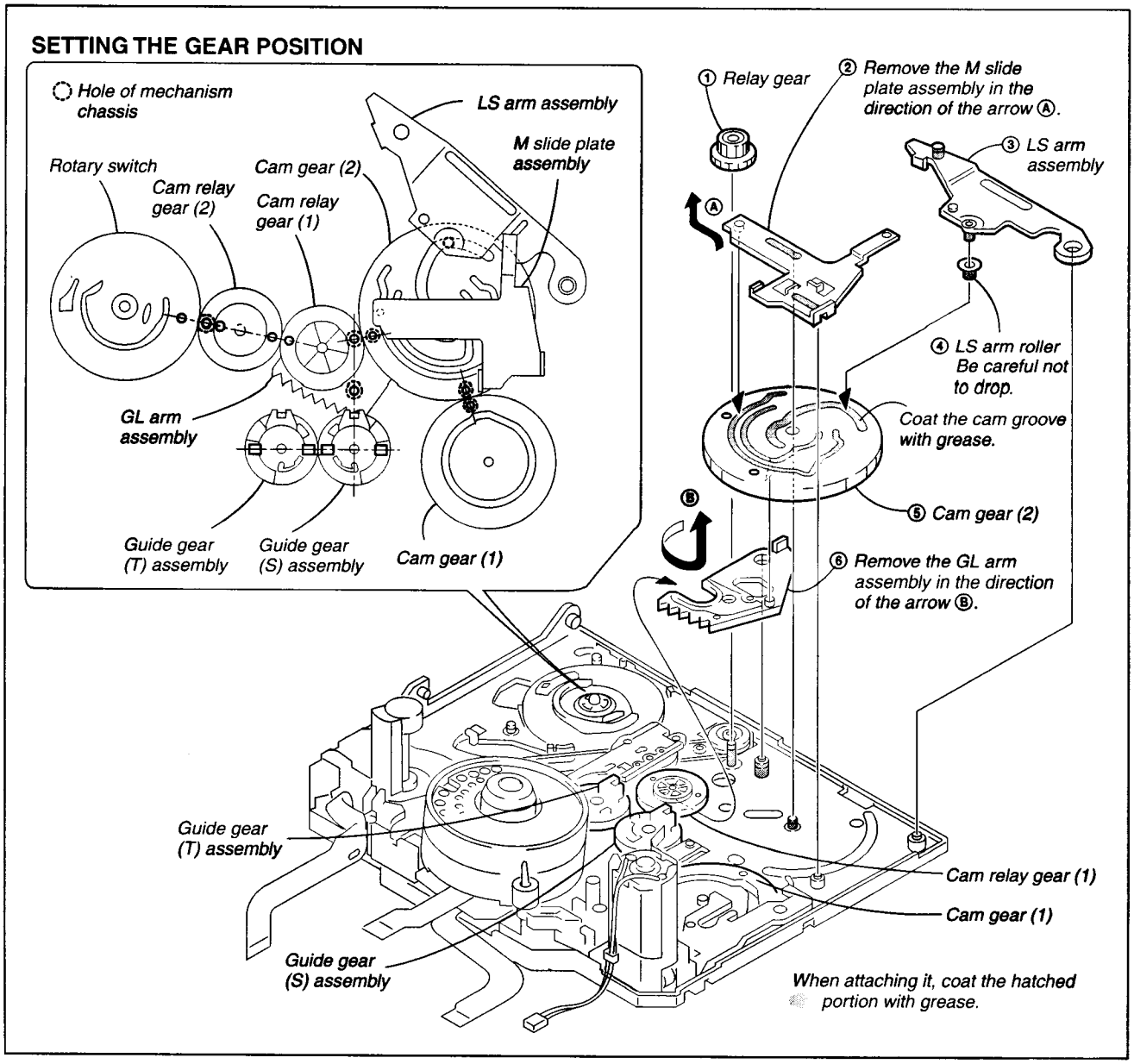

SETTING THE GEAR POSITION
○ Hole of mechanism chassis
LS arm assembly
M slide plate assembly
Rotary switch
Cam relay gear (2)
Cam gear (2)
Cam relay gear (1)
GL arm assembly
Guide gear (T) assembly
Guide gear (S) assembly
Cam gear (1)
① Relay gear
② Remove the M slide plate assembly in the direction of the arrow Ⓐ.
③ LS arm assembly
④ LS arm roller Be careful not to drop.
Coat the cam groove with grease.
⑤ Cam gear (2)
⑥ Remove the GL arm assembly in the direction of the arrow Ⓑ.
Guide gear (T) assembly
Cam relay gear (1)
Cam gear (1)
Guide gear (S) assembly
When attaching it, coat the hatched portion with grease.

Fig. 4-19.

5. Adjustment

5-1. Check and Adjustment of TG1 Back-tension Position

1. Check Procedure

1) Assemble the mechanism deck into the main unit.
2) Thread a normal tape and let the machine enter the PB (or REC) mode.
3) Check that the distance between the upper flange of the TG1 guide and the side surface of the LS chassis block is 12.0 ± 0.4 mm (range of fluctuation: 0.5 mm or less).

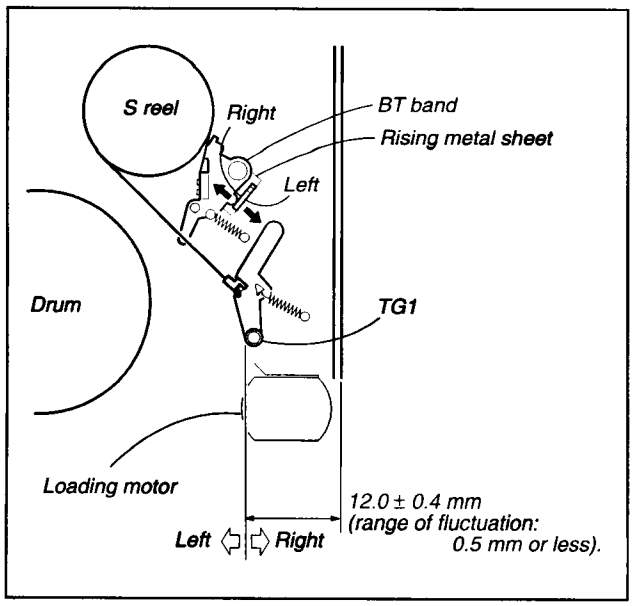


Fig. 5-1.

2. Adjustment Procedure

1) Remove the cassette compartment and the blind plate.
2) Adjust the position of the TG1 guide by changing the tilt of the rising metal sheet of the LS chassis block assembly.

5-2. Check and Adjustment of FWD/RVS Back-tension

1. Check Procedure

1) Install the mechanism deck in the main unit and set the take-up torque cassette (Ref. No. J-7).
2) Check the FWD/RVS take-up torque.
   Check the FWD torque in the PLAY state.
   Specified value: 7 to 12 gf•cm
   Check the RVS torque in the RVS state.
   Specified value: 19.5 to 29.5 gf•cm

2. Adjustment Procedure

1) If the value of the FWD torque is larger than the specifications, change the position where the TG1 arm spring is hooked in the direction of the arrow Ⓐ. If the value of the FWD torque is smaller than the specifications, change the position in the direction of the arrow Ⓑ.

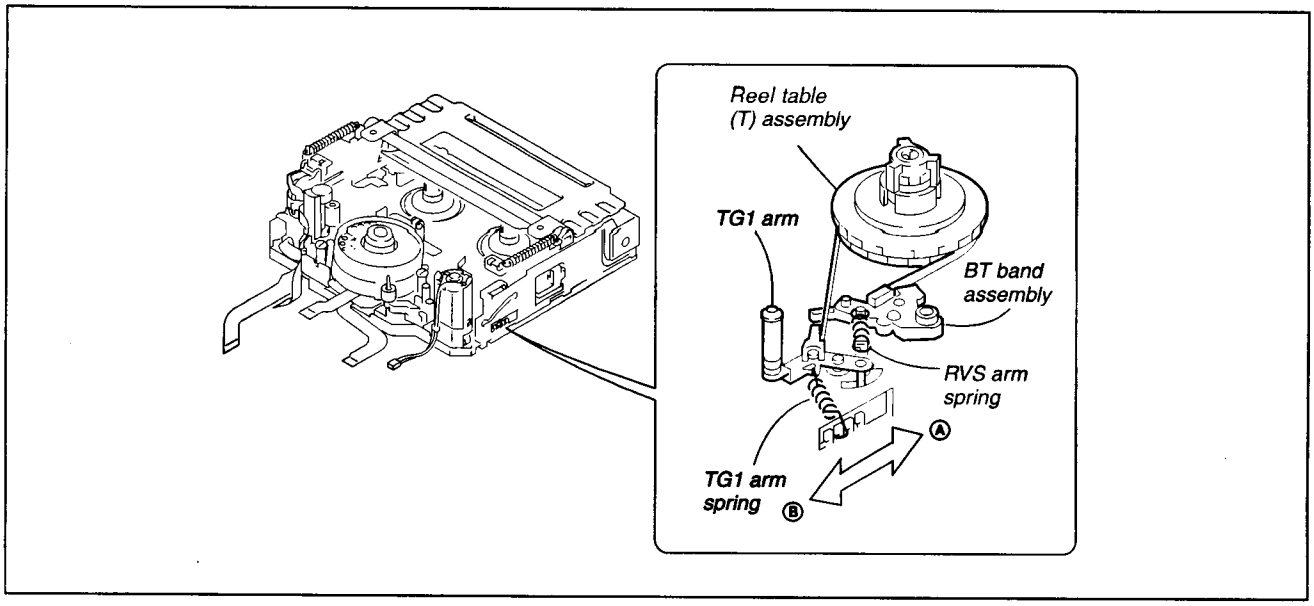


Fig. 5-2.

5-3. Capstan Motor Azimuth Position Adjustment

1. Check Procedure

1) Insert the thickness gauge (Ref. No. J-16) of 0.75 mm between the protrusion of the mechanism chassis and the capstan motor, and check the azimuth position.

2. Adjustment Procedure

1) Loosen the capstan azimuth adjustment screw (SANG camera pan 2 M1.4 × 4.5), and insert the thickness gauge (0.75 mm)(Ref. No. J-16) between the protrusion of the mechanism chassis and the capstan motor.
2) Slowly tighten the capstan azimuth adjustment screw until it slightly contacts the thickness gauge, and remove the thickness gauge.

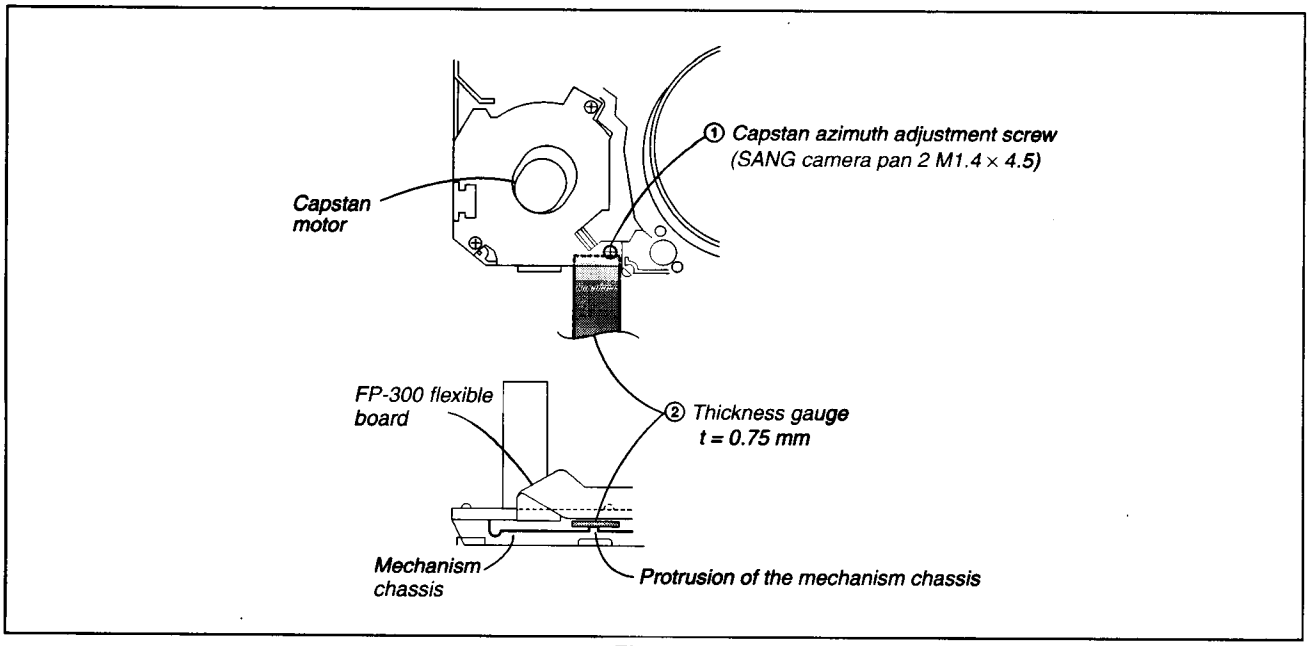


Fig. 5-3.

5-4. Tape Path Adjustment

Purpose: Adjust the linearity of the head.

If the adjustment is not correct:

Noise appears on the top and bottom of the screen when playing back the tape that is recorded by other recorders.

5-4-1. Adjustment Preparation

1) Clean the tape running surface (tape guides, drum, capstan shaft, pinch roller).
2) Connect the adjustment remote commander to the remote terminal.
3) Set the adjustment remote commander to the PATH mode (track shift mode)* and release the auto tracking.
4) Connect an oscilloscope as follows:
   CH1: Test connector' PB RF terminal
   External trigger: Test connector' RF SWP terminal
5) Playback the tracking alignment tape WR5-1NP (NTSC), WR5-1CP (PAL) (Ref. No. J-6).
6) Confirm that the RF waveform on scope is flat both at entrance side and exit side.
   If the RF waveform is not flat, perform the adjustment by referring to section 4-2.)
7) After the adjustment is completed, release the PATH mode (track shift mode)*.

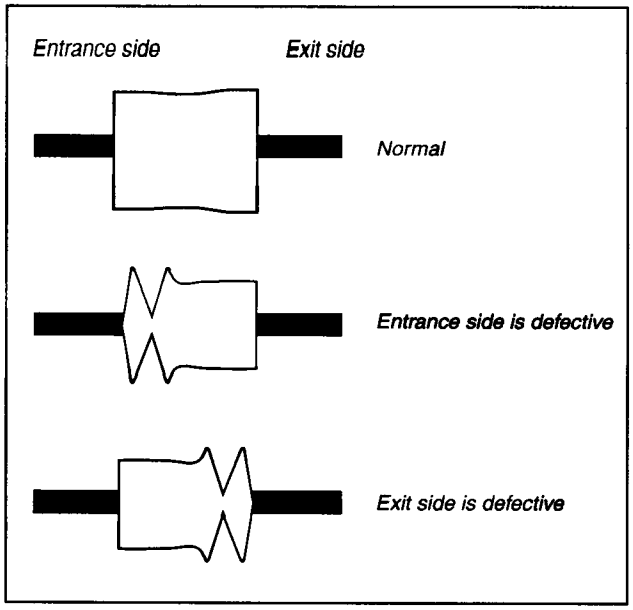


Fig. 5-4.

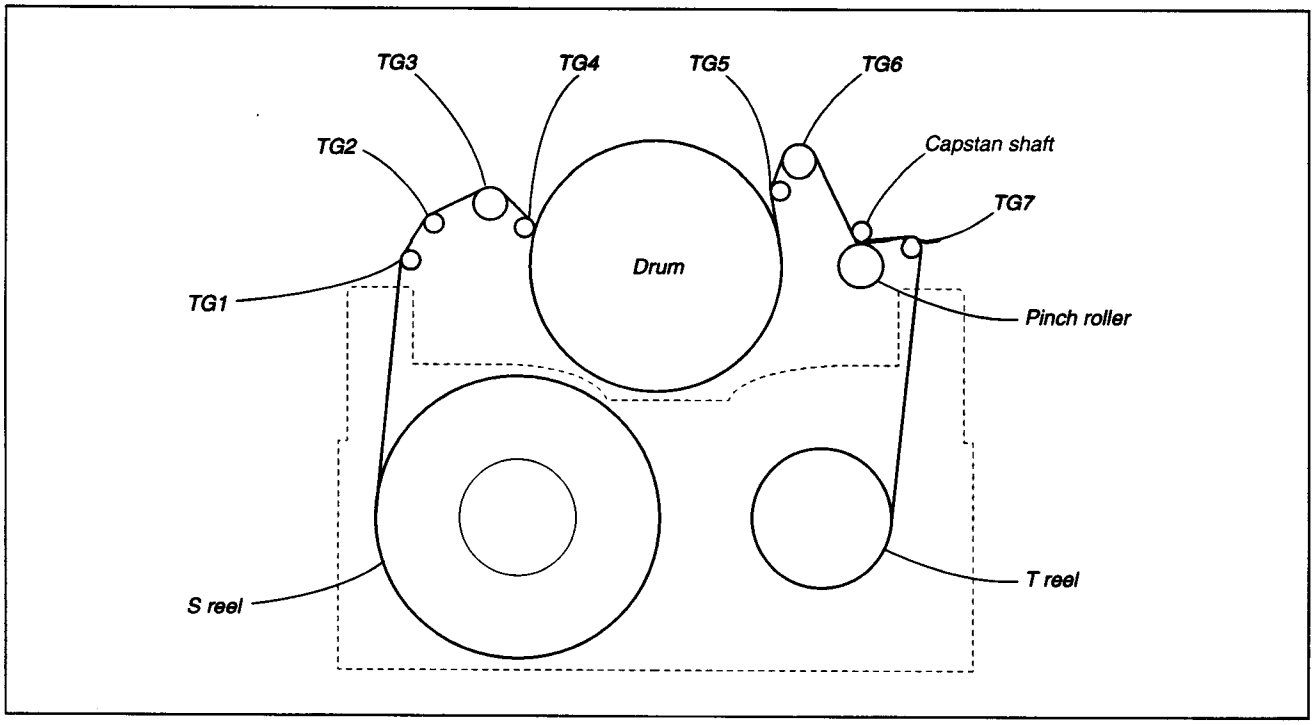


Fig. 5-5.

*** Setting and releasing the track shift mode**

In case of the DCR-TRV230

Setting

1. Select page: 0, address: 01 and set data: 01.
2. Select page: F, address: 22 and set data: 88, and press the PAUSE button.
3. Select page: 2, address: 2E and set data: 02. (Note)

Releasing

1. Select page: 0, address: 01 and set data: 01.
2. Select page: F, address: 22 and set data: 80, and press the PAUSE button.
3. Select page: 2, address: 2E and set data: 00.
4. Select page: 0, address: 01 and set data: 00. (Note)

Note: In case of the Digital8 only, set the data of page: 2, address: 2E.

5-4-2. Tracking Adjustment (Refer to Fig. 5-6.)

1) Playback the tracking alignment tape WR5-1NP (NTSC), WR5-1CP (PAL) (Ref. No. J-6).
2) Adjust the No.3 guide until the envelope at the entrance side waveform becomes flat.
3) Adjust the No.6 guide until the envelope at the exit side waveform becomes flat.

☆ The TG-3/6 zenith adjustment screws do not need to be adjusted.

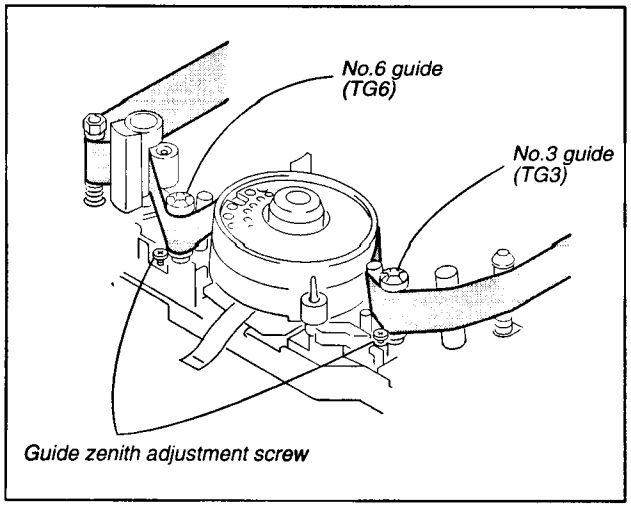


Fig. 5-6.

5-4-3. No.7 Guide (TG7) Adjustment (Refer to Fig. 5-7.)

1) Playback the tape and set the REV mode.
2) Confirm that tape slack does not occur in between the No.6 guide (TG6) ① and capstan ②. If any tape slack occurs, rotate the TG7 nut ④ of the No.7 guide (TG7) ③ to remove the tape slack.
3) Playback the tape again and confirm that tape slack does not occur between the capstan ② and No.7 guide (TG7) ③. If the tape slack occurs exceeding the specifications (specifications: 0.5 mm or less), rotate the TG7 nut ④ to make the tape slack below the specifications (0.5 mm). When the tape slack between the No.6 guide (TG6) ① and capstan ② is 0.3 mm or less in the REV mode, it means that the adjustment is completed.

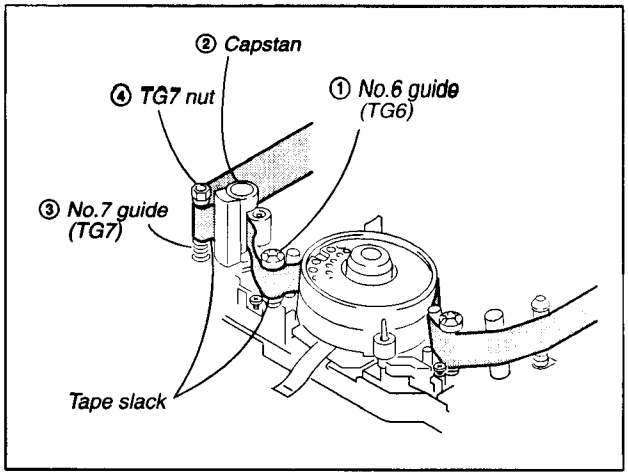


Fig. 5-7.

5-4-4. CUE and REV Waveform Check (Refer to Fig. 5-8)

1) Playback the tracking alignment tape WR5-1NP (NTSC), WR5-1CP (PAL)(Ref. No. J-6) and enter the REV mode. Confirm on an oscilloscope that the pitches between the peaks of the RF waveform are equally spaced for 5 seconds or more. If pitches between peaks of the RF waveform are not equal, perform sections "5-4-2 Tracking Adjustment" and "5-4-3 No. 7 Guide (TG7) Adjustment".
2) Enter the UCE mode. Confirm on an oscilloscope that the pitches between the peaks of the RF waveform are equally spaced for 5 seconds or more. If pitches between peaks of the RF waveform are not equal, perform section "5-4-2 Tracking Adjustment".

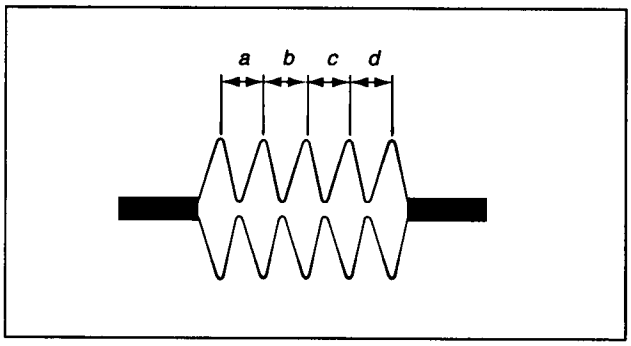


Fig. 5-8.

5-4-5. Check upon Completion of Adjustment

5-4-5-1. Tracking Check

1) Playback the tracking alignment tape in the PATH mode. Compare the amplitude of the RF waveform in the AUTO tracking mode and with that in the PATH mode. Confirm that the amplitude of the RF waveform decreases to about 3/4 when the tracking alignment tape is switched from the AUTO tracking mode to the PATH mode. (Refer to Fig. 5-9)
2) During step 1, confirm that the minimum amplitude (E MIN) is 65% or more of the maximum amplitude (E MAX) of the RF waveform. (Refer to Fig. 5-10)
3) Confirm that the RF waveform does not fluctuate too excessively.(Refer to Fig. 5-11)

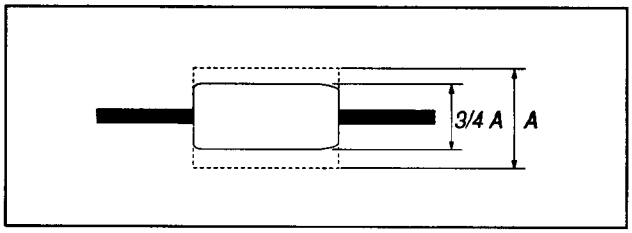


Fig. 5-9.

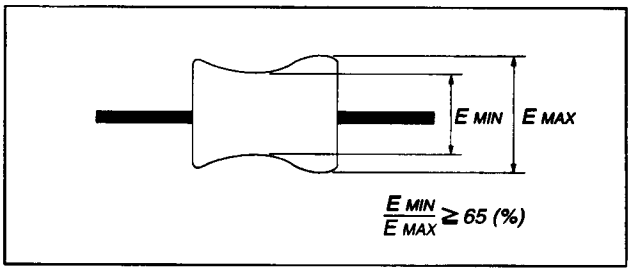


Fig. 5-10.

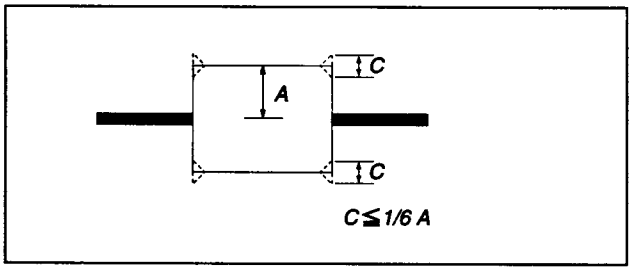


Fig. 5-11.

5-4-5-2. Rise-up Check (Refer to Fig. 5-12)

1) Playback the tracking alignment tape WR5-1NP (NTSC), WR5-1CP (PAL)(Ref. No. J-6).
2) Turn OFF the Track Shift mode.
3) Eject the cassette tape once. Then insert the cassette tape for loading again.
4) Confirm that the RF waveform rises up to the flat envelope within 3 seconds after the machine enters the PLAY mode. Check also that the tape slack does not occur at around the pinch roller.
5) Run the tape in the CUE/REV and the FF/REW mode. Then playback the tracking alignment tape and confirm the RF waveform rises up to the flat envelope within 3 seconds after the machine enters the PLAY mode. Check also that the tape slack does not occur at around the pinch roller.
6) Repeat the above steps 3) to 5) once again for re-check.

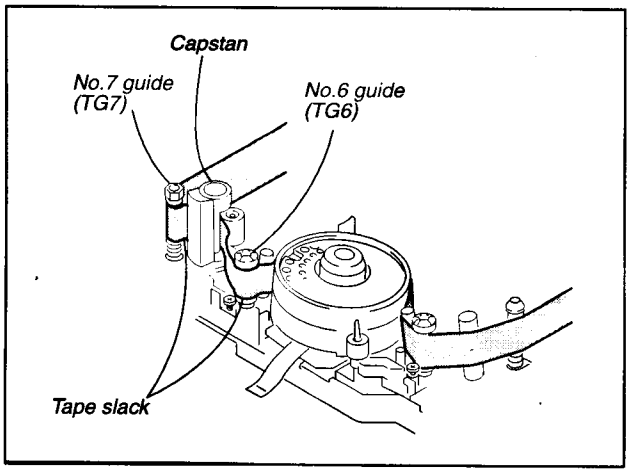


Fig. 5-12.

5-4-5-3. Tape Run Check (Refer to Fig. 5-13)

1) Playback the thin video tape such as P6-120MP (NTSC), P6-90MP (PAL). Confirm that tape does not float and the major tape curl of more than 0.3 mm does not occur at the top flange of the No. 3 guide (TG3), at the top flange of the No. 6 guide (TG6) and at both the top and bottom flanges of the No. 7 guide (TG7).
2) Confirm that tape does not float and the major tape curl of more than 0.3 mm does not occur at the flanges of the respective guide when the FF button is pressed during PLAY mode to enter the CUE mode and when the REW button is pressed during PLAY mode to enter the REV mode.

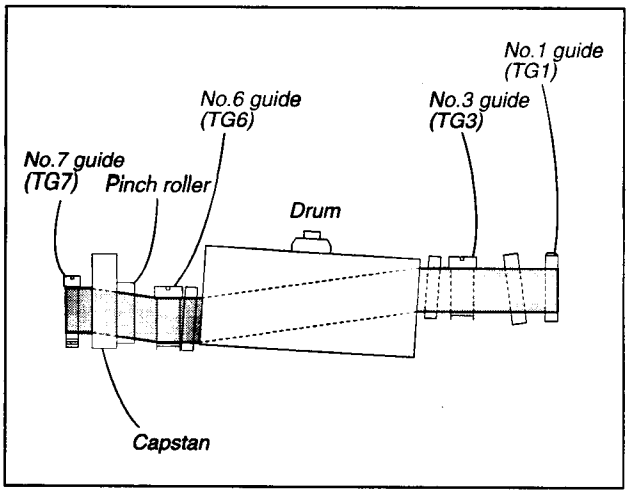
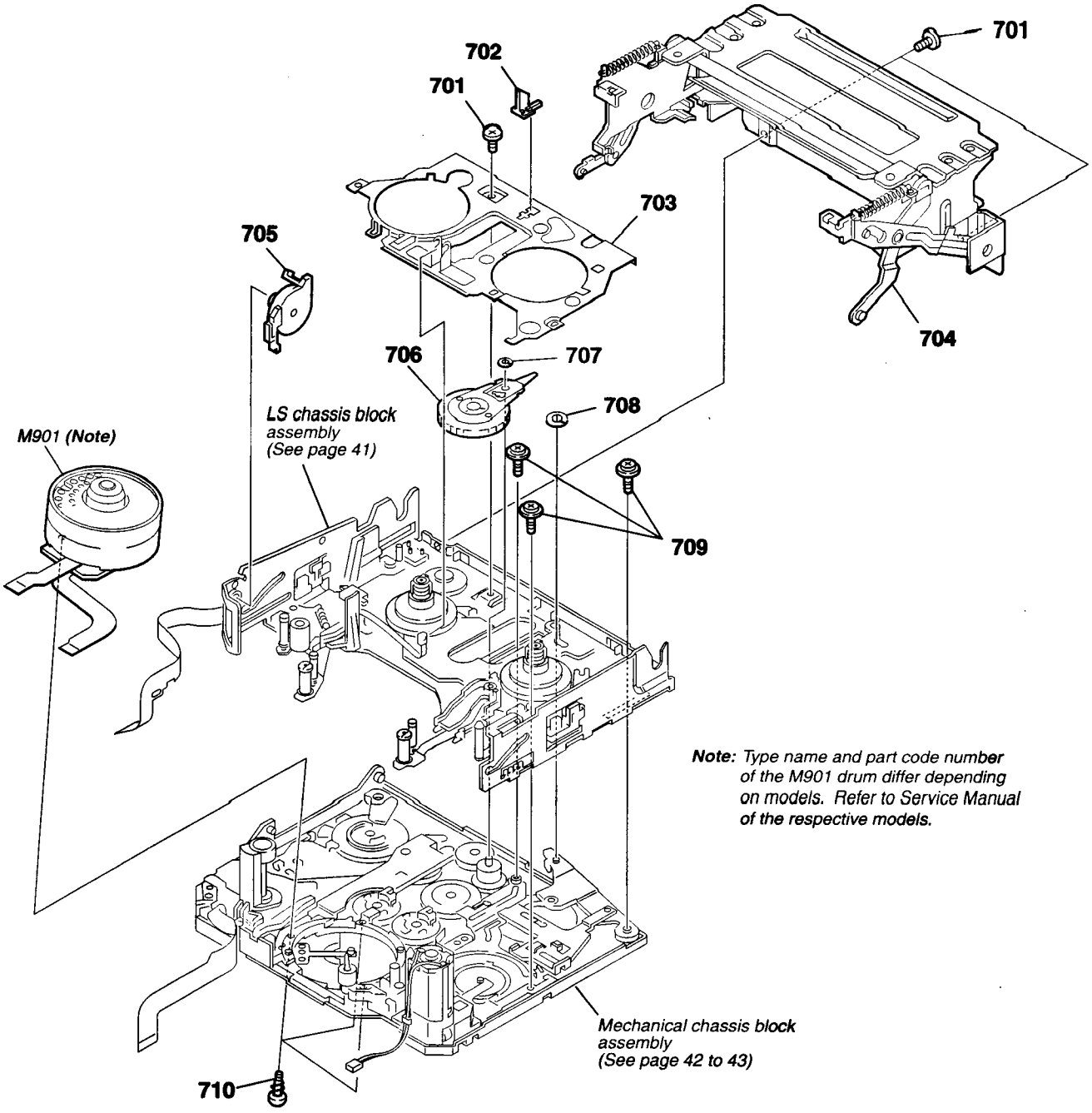


Fig. 5-13.

6. Exploded Views

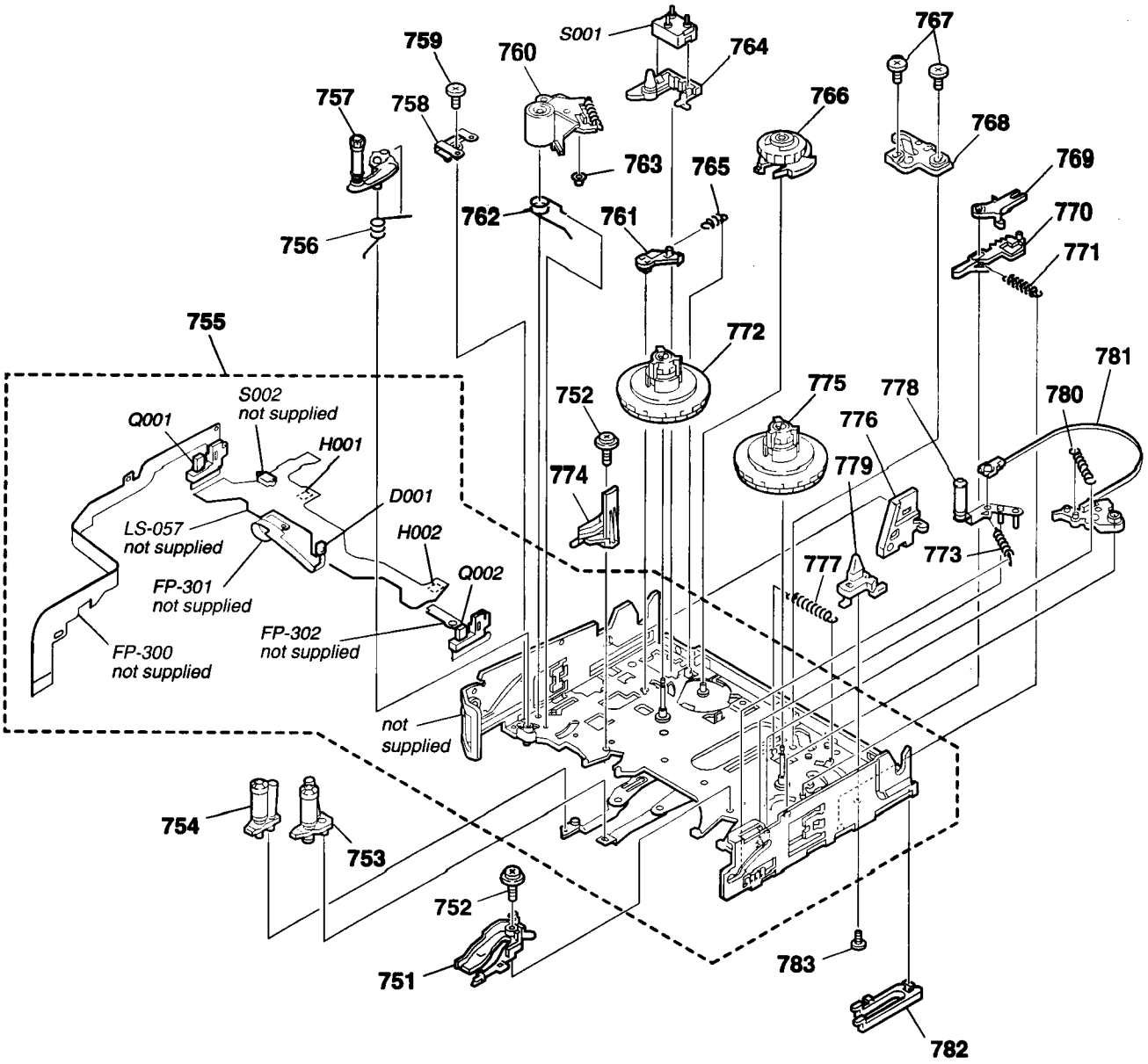
6-1. Cassette Compartment Assy, Drum Assy



Note: *Type name and part code number of the M901 drum differ depending on models. Refer to Service Manual of the respective models.*

Ref. No.	Part No.	Description	Remarks
701	3-065-932-01	PAN (2 MAIN M1.4X1.6), CAMERA	
702	3-065-895-01	LEVER, REEL RELEASE	
703	3-065-896-01	PLATE, BLIND	
704	X-3951-298-1	CASSETTE COMPARTMENT ASSY	
705	X-3951-302-1	DAMPER ASSY	
706	X-3951-297-1	GEAR ASSY, R DRIVE	
707	3-065-840-01	CUT (0.98X3X0.13), LUMILER (W)	
708	3-065-935-01	HLC CUT (1.8X4X0.5)	
709	3-947-503-01	SCREW (M1.4)	
710	X-3951-299-1	SCREW ASSY, DRUM FITTING	
M901	— Note —	DRUM	

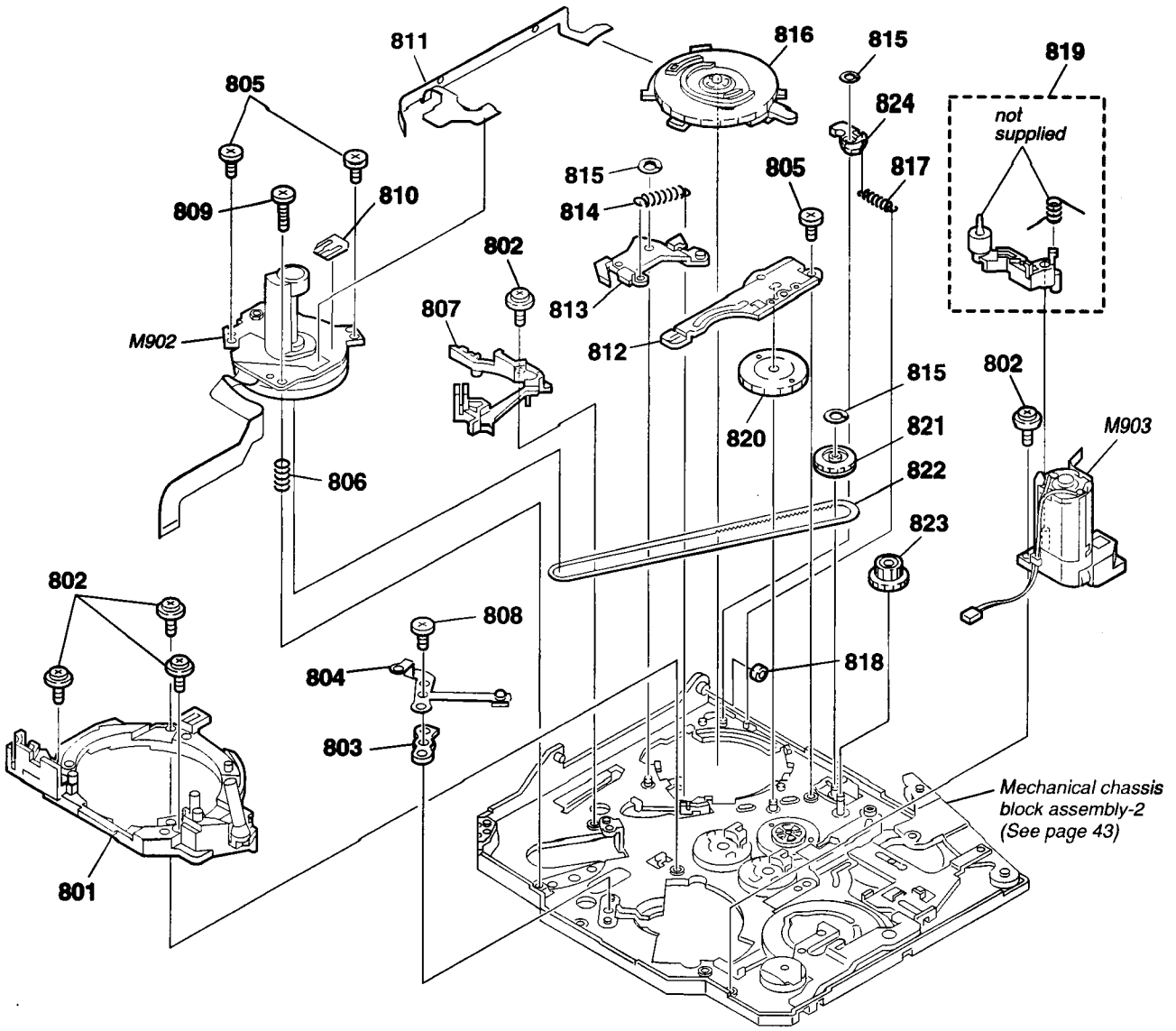
6-2. LS Chassis Block Assembly



Ref. No.	Part No.	Description	Remarks
751	3-065-822-01	RAIL (S), GUIDE	
752	3-947-503-01	SCREW (M1.4)	
753	A-7096-416-A	BASE (S) BLOCK ASSY, GUIDE	
754	A-7096-415-A	BASE (T) BLOCK ASSY, GUIDE	
755	A-7096-426-A	CHASSIS ASSY, LS	
756	3-065-802-01	SPRING, TG7 ARM	
757	A-7096-414-A	ARM BLOCK ASSY, TG7	
758	3-065-801-01	RETAINER, TG7	
759	3-065-932-01	PAN (2 MAIN M1.4X1.6), CAMERA	
760	X-3951-303-1	ARM ASSY, PINCH	
761	3-065-823-01	ARM, T RATCHET	
762	3-065-794-01	ROAD (SPR), PINCH ARM	
763	3-065-792-01	ROLLER, P LIM ARM	
764	3-065-834-01	GUIDE (T), CASSETTE	
765	3-065-824-01	SPRING, T RATCHET	
766	A-7096-417-A	SOFT ASSY, T	
767	7-627-852-38	SCREW,PRECISION +P1.7X1.8 TYPE3	
768	3-065-832-01	PLATE, LS CAM	
769	3-065-828-01	ARM, S RATCHET	
770	3-065-829-01	PLATE, S RATCHET (RE)	

Ref. No.	Part No.	Description	Remarks
771	3-065-830-01	SPRING, S RATCHET	
772	X-3951-288-1	TABLE (T) ASSY, REEL	
773	3-065-819-01	SPRING, TG1 ARM	
774	3-065-821-01	RAIL (T), GUIDE	
775	X-3951-289-1	TABLE (S) ASSY, REEL	
776	3-065-833-01	GUIDE, LOCK	
777	3-065-831-01	PLATE (SPR), RE RETURN	
778	X-3951-304-1	ARM ASSY, TG1	
779	3-065-835-01	GUIDE (S), CASSETTE	
780	3-065-820-01	SPRING, RVS ARM	
781	X-3951-296-1	BAND (ASSY), BT	
782	3-065-836-01	COVER, LS GREASE	
783	3-067-167-01	SCREW (M1.4X2), CAMERA TAPPING	
D001	8-719-988-42	DIODE GL453 (TAPE LED)	
H001	8-719-033-37	ELEMENT, HALL HW-105C (T REEL)	
H002	8-719-033-37	ELEMENT, HALL HW-105C (S REEL)	
Q001	8-729-907-25	PHOTO TRANSISTOR PT4850F (TAPE TOP)	
Q002	8-729-907-25	PHOTO TRANSISTOR PT4850F (TAPE END)	
S001	1-692-614-11	SWITCH, PUSH (3 KEY) (REC PROOF)	

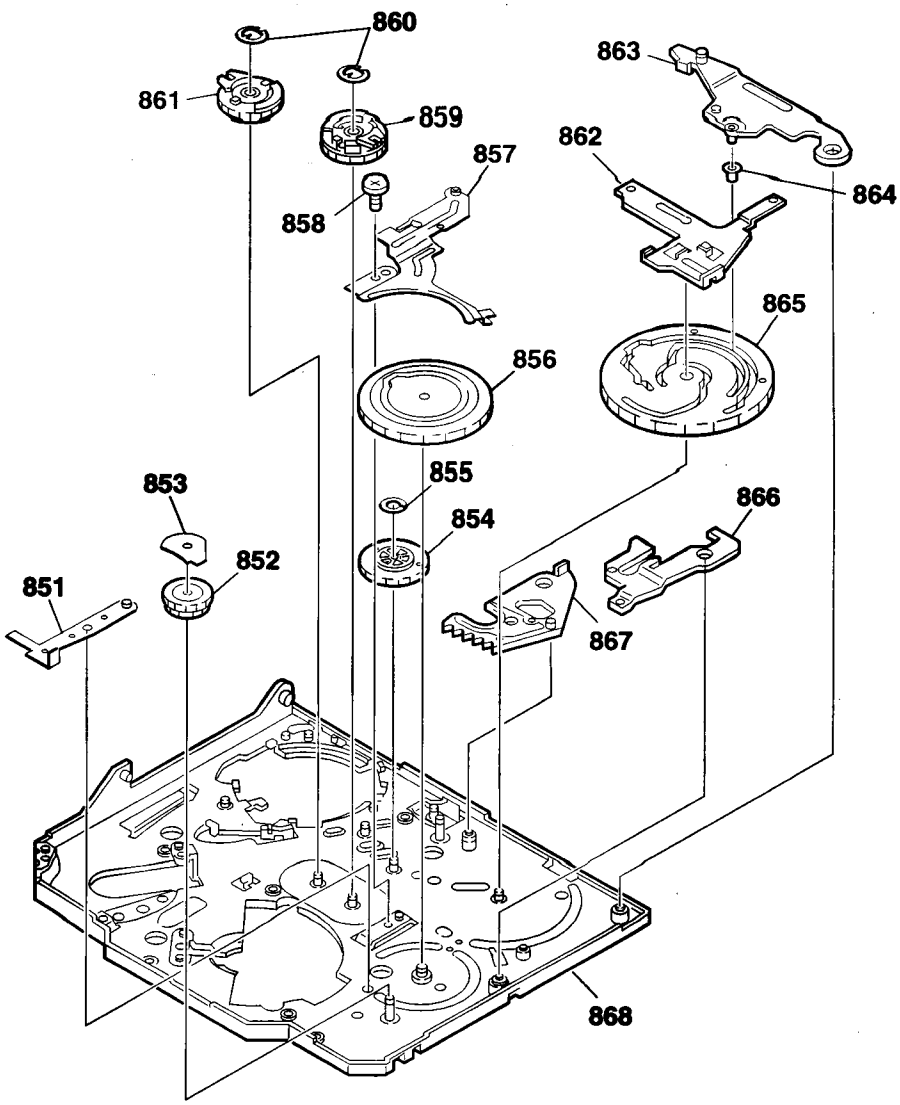
6-3. Mechanical Chassis Block Assembly-1



Ref. No.	Part No.	Description	Remarks
801	A-7096-422-A	BASE ASSY, DRUM	
802	3-947-503-01	SCREW (M1.4)	
803	3-065-928-01	SPACER, GROUND	
804	3-065-927-01	GROUND, DRUM	
805	3-065-932-01	PAN (2 MAIN M1.4X1.6), CAMERA	
806	3-067-154-01	SPRING, CAPSTAN	
807	3-065-931-01	RAIL (T2), GUIDE	
808	X-3947-398-1	SCREW ASSY, M1.7 PW	
809	3-065-933-01	PAN (2 MAIN 1.4X4.5), CAMERA	
810	1-677-049-11	FP-228 FLEXIBLE BOARD (DEW SENSOR)	
811	1-680-434-11	FP-299 FLEXIBLE BOARD	
812	3-065-877-01	PLATE (T), GUIDE LOCK	
813	X-3951-301-1	PLATE ASSY, PINCH PRESSURE	

Ref. No.	Part No.	Description	Remarks
814	3-065-881-01	SPRING, P PRESSURE PLATE	
815	3-065-934-01	HLW CUT 0.98X3X0.25	
816	1-786-096-11	SWITCH, ROTARY	
817	3-065-898-01	SPRING, EJECT ARM	
818	3-065-870-01	ROLLER, LS GUIDE	
819	A-7096-421-A	ARM ASSY, HCL	
820	3-065-918-01	GEAR (2), CAM RELAY	
821	A-7096-419-A	GEAR ASSY, CHANGE	
822	3-065-902-01	BELT, TIMING	
823	3-065-905-01	GEAR, RELAY	
824	3-065-882-01	ARM, EJECT	
M902	8-835-701-01	MOTOR, DC SCE13A/C-NP (CAPSTAN)	
M903	A-7096-420-A	MOTOR ASSY, LD (LOADING)	

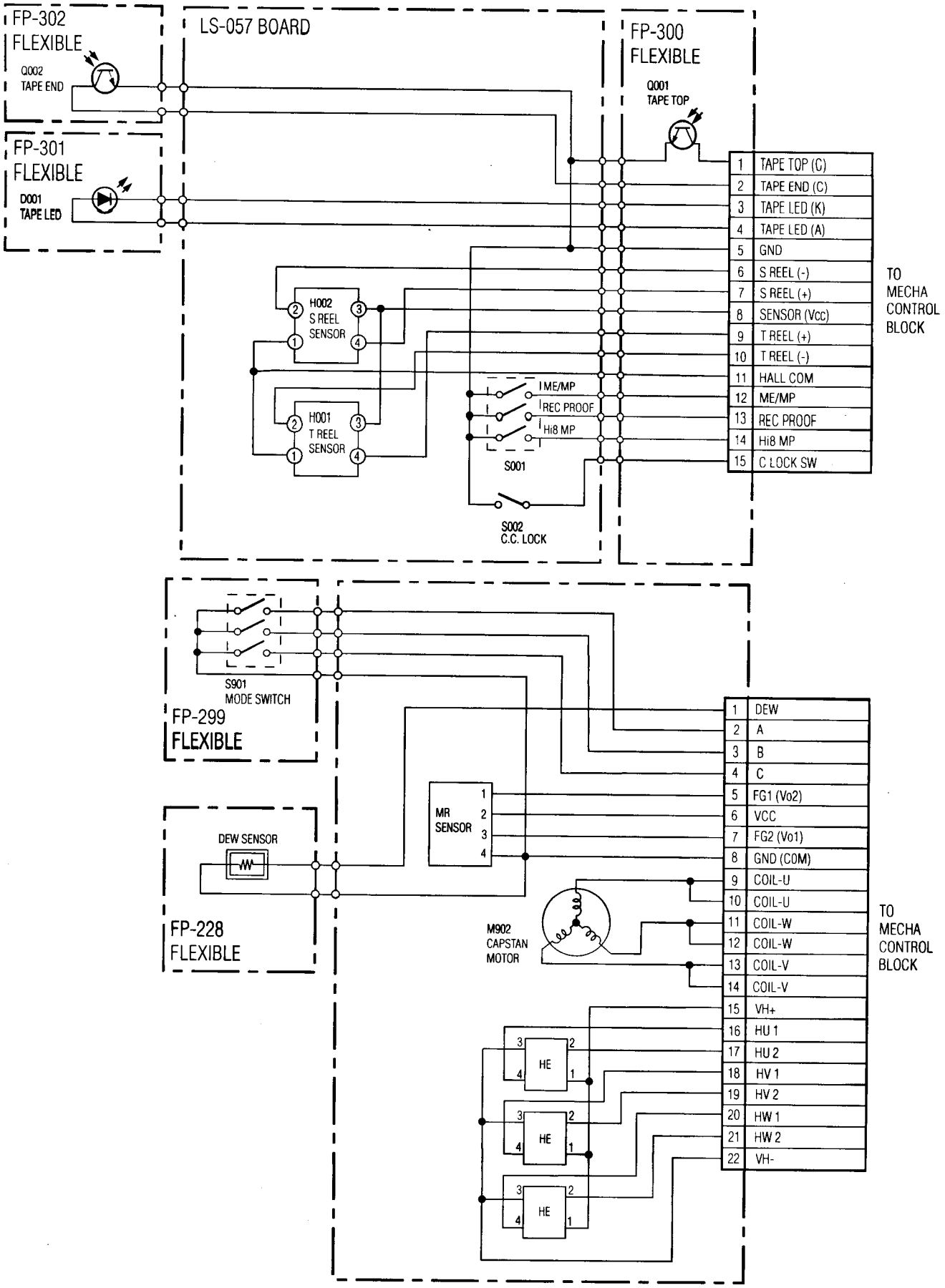
6-4. Mechanical Chassis Block Assembly-2



Ref. No.	Part No.	Description	Remarks
851	3-065-920-01	ARM, HC DRIVE	
852	3-065-913-01	GEAR (4), LD	
853	3-065-914-01	SHEET, COVER	
854	3-065-917-01	GEAR (1), CAM RELAY	
855	3-065-934-01	HLW CUT 0.98X3X0.25	
856	3-065-915-01	GEAR (1), CAM	
857	3-065-878-01	PLATE (S), GUIDE LOCK	
858	3-065-932-01	PAN (2 MAIN M1.4X1.6), CAMERA	
859	A-7096-413-A	GEAR (S) ASSY, GUIDE	

Ref. No.	Part No.	Description	Remark
860	7-624-101-04	STOP RING 1.2 (E TYPE)	
861	A-7096-412-A	GEAR (T) ASSY, GUIDE	
862	X-3951-307-1	PLATE ASSY, M SLIDE	
863	X-3951-305-1	ARM ASSY, LS	
864	3-065-901-01	ROLLER, LS ARM	
865	3-065-916-01	GEAR (2), CAM	
866	3-065-919-01	ARM, T1 LIMITTER	
867	X-3951-308-1	ARM ASSY, GL	
868	X-3951-300-1	CHASSIS ASSY, MECHANICAL	

7. Printed Wiring Boards and Schematic Diagrams



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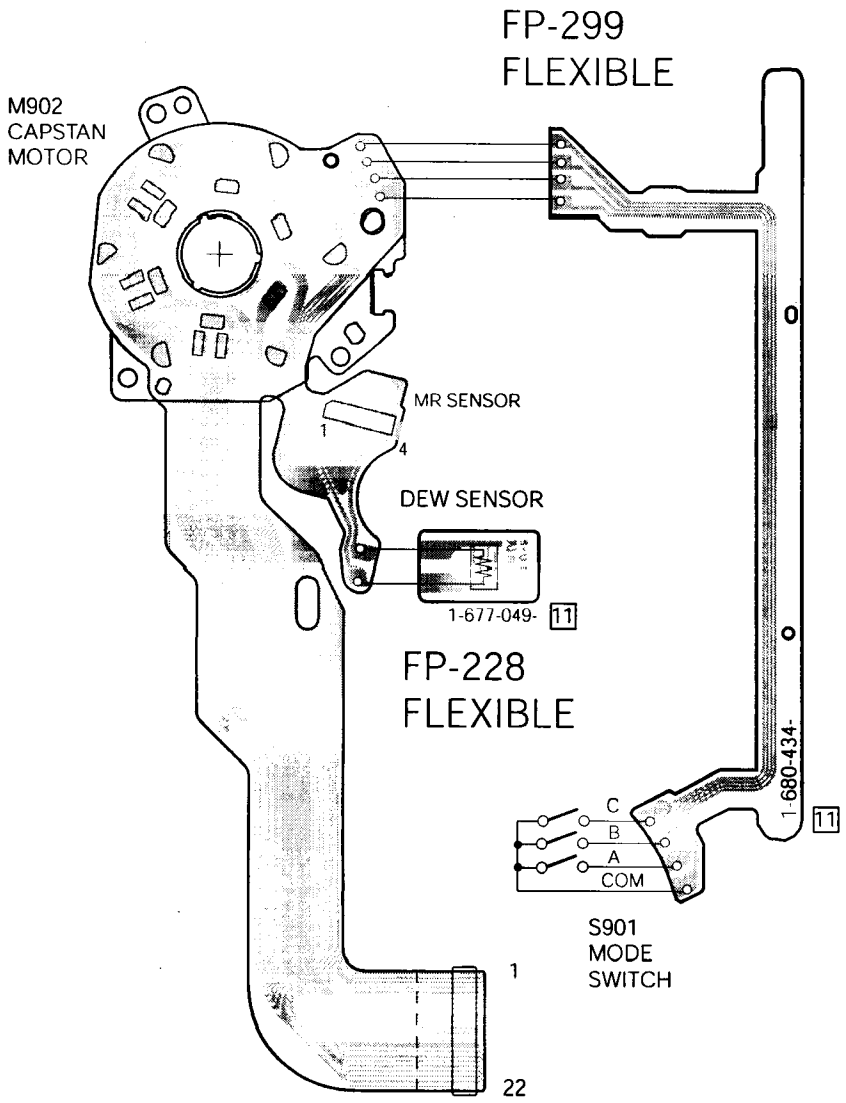
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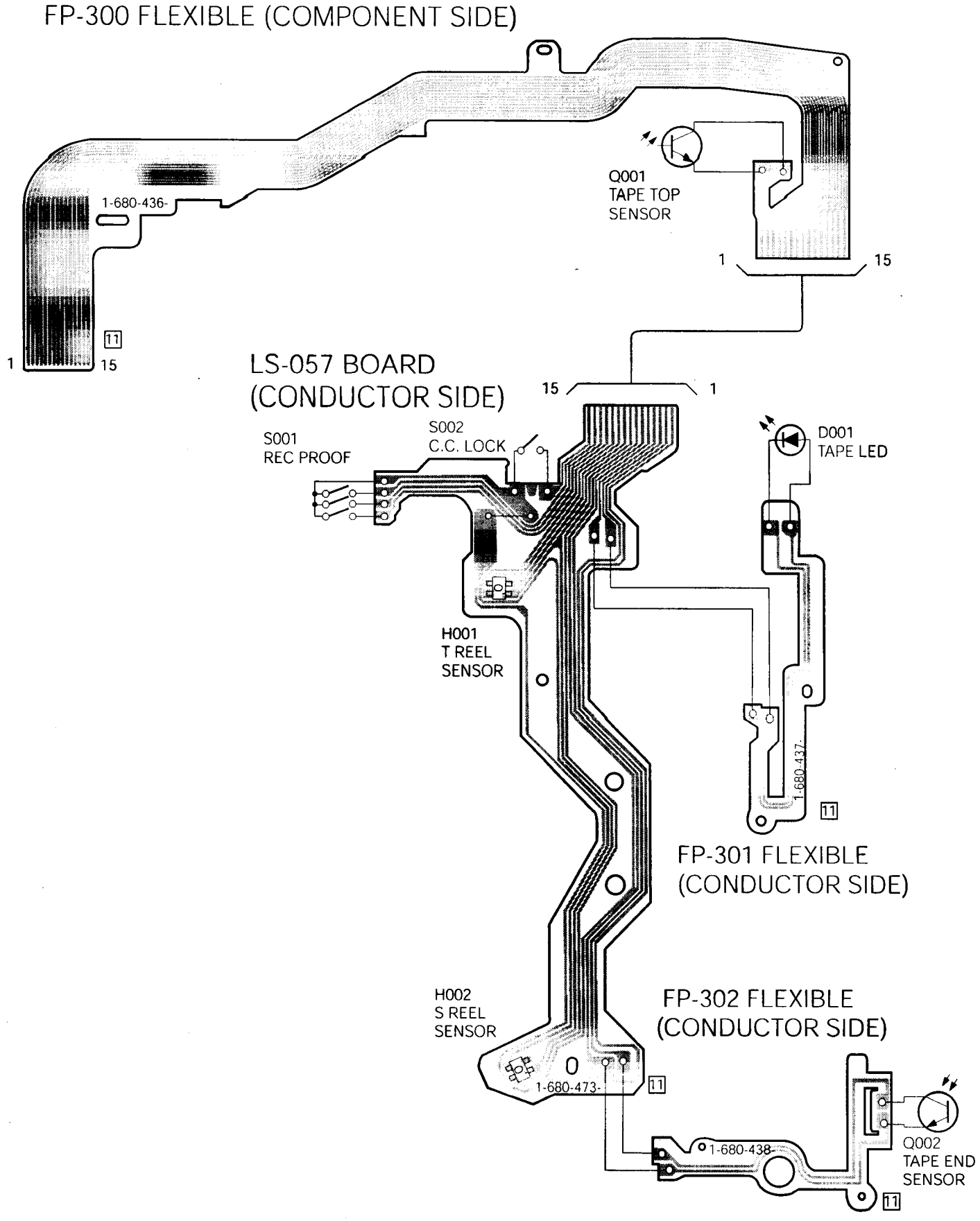
FLEXIBLE
M902
CAPSTAN
MOTOR
MR SENSOR
1
4
DEW SENSOR
1-677-049- 11
FP-228
FLEXIBLE
1-680-434- 11
C
B
A
COM
S901
MODE
SWITCH
1
22


FP-300 FLEXIBLE (COMPONENT SIDE)
1-680-436-
Q001
TAPE TOP
SENSOR
1
15
11
1
15
LS-057 BOARD
(CONDUCTOR SIDE)
15
1
S001
REC PROOF
S002
C.C. LOCK
D001
TAPE LED
H001
T REEL
SENSOR
1-680-437-
11
FP-301 FLEXIBLE
(CONDUCTOR SIDE)
H002
S REEL
SENSOR
FP-302 FLEXIBLE
(CONDUCTOR SIDE)
1-680-473-
11
1-680-438-
Q002
TAPE END
SENSOR
11